Mackenzie Valley Review Board

Report of Environmental Assessment and Reasons for Decision

EA0809-002: Canadian Zinc Corporation

Prairie Creek Mine

December 8, 2011

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List of abbreviations

AANDC	Aboriginal Affairs and Northern Development Canada (AANDC is used in place of INAC in all instances in this document)
AEMP	Aquatic Effects Management Plan
CCME	Canadian Council of Ministers of the Environment
CPAWS	Canadian Parks and Wilderness Society
CZN	Canadian Zinc Corporation
DAR	Developer's Assessment Report
DFO	Department of Fisheries and Oceans Canada
DMS	Dense Media Separation
EAO	Environment Assessment Officer
EC	Environment Canada
GNWT	Government of the Northwest Territories
LKFN	Liidlii Kue First Nation
MOU	Memorandum of Understanding
MVLWB	Mackenzie Valley Land and Water Board
MVRB	Mackenzie Valley Review Board
NBDB	Nahanni Butte Dene Band
NNPR	Nahanni National Park Reserve
NRCan	Natural Resources Canada
NWT	Northwest Territories
NWTCA	Northwest Territories Court of Appeal
PR	Public registry
RCA	Reference condition approach
SARA	*Species at Risk Act*
SDB	Sambaa K'e Dene Band
SSWQOs	Site specific water quality objectives
TC	Transport Canada
WQO	Water quality objective
WRP	Waste rock pile
WSP	Water storage pond

Review Board decision

To make its decision in this environmental assessment, the Mackenzie Valley Environmental Impact Review Board (Review Board) has relied upon all the information on the public record.

Based on the evidence and information on the public record, it is the Review Board's opinion that the proposed Prairie Creek Mine development is not likely to cause significant adverse impacts on the environment.

The Review Board has concluded, pursuant to paragraph 128 (1) (a) of the *Mackenzie Valley Resource Management Act*, that the proposed development as described in this Report of Environmental Assessment, including the list of commitments made by the developer during the proceedings, is not likely to have any significant adverse impacts on the environment or to be a cause for significant public concern. The Review Board has therefore concluded that an environmental impact review of this proposed development is not necessary and that the Prairie Creek Mine project should proceed to the regulatory phase for approvals.

December 8, 2011

Richard Edjericon
Chairperson of the Mackenzie Valley
Environmental Impact Review Board

Executive summary

The Mackenzie Valley Environmental Impact Review Board (Review Board) conducted an environmental assessment of the Prairie Creek Mine in the Dehcho Region of the Northwest Territories. The developer of the project is Canadian Zinc Corp.

The Review Board finds that the Prairie Creek Mine is not likely to have significant adverse impacts on the environment or to be a cause of significant public concern. The Review Board has therefore concluded that an environmental impact review of this proposed development is not necessary and that the Prairie Creek Mine project should proceed to the regulatory phase for approvals.

The Review Board based its decision on the assumption that Canadian Zinc Corp. will fulfill its commitments made during the proceedings. In the Review Board's opinion, it is therefore important that the developer, appropriate regulatory authorities and government agencies ensure that the developer fulfills its commitments listed in Appendix B and described throughout this document.

Suggestions

The Review Board has provided a series of suggestions that would improve the monitoring and management of potential impacts from this development.

Suggestion #1
The Review Board believes that either option proposed by Canadian Zinc Corp. to increase water storage on site will improve water quality in Prairie Creek. The Review Board notes that construction of a second pond may address a broader range of risks and result in better water management on site and improved water quality in Prairie Creek. The Review Board suggests that the Mackenzie Valley Land and Water Board consider this during the licensing phase.

Suggestion #2
The Review Board suggests that Canadian Zinc Corp. prepare a Tailings Management Plan for both the permanent storage of tailings underground and the temporary storage of tailings on surface at the mine site. The Review Board suggests that this Plan should be part of the water license.

Suggestion #3
The Review Board recognizes that there are better ways to contain concentrate during transport along the winter road than the bag method proposed by the developer. The Review Board suggests that the developer use secondary containment of concentrate during transport along the winter road to reduce the risk of contaminant dispersal. The Mackenzie Valley Land and Water Board and Parks Canada can best address this during the regulatory phase.

Proposed development

The proposed development involves:

- Constructing an underground lead zinc mine producing up to a maximum of 1,200 tonnes of ore per day
- Upgrading or replacing existing mine site facilities
- Constructing a new water treatment plant, paste backfill plant, dense media separation plant and other facilities at the mine site
- Constructing a waste rock pile in the Harrison Creek valley
- Re-designing the existing water storage pond and possibly constructing a second water storage pond
- Re-clearing of the existing winter road from the mine site to the Liard Highway and re-aligning portions of the winter road route

Canadian Zinc Corp. has proposed design modifications to the mine site and winter access road throughout this environmental assessment to improve the project and minimize potentially adverse impacts to the environment. Key design modifications include the developer's commitment to increase water storage capacity at the mine site, an improved mine effluent outfall design, an enhanced water treatment plant and re-alignments to the winter road. The final list of commitments is found in Appendix B. These commitments are important to the Review Board's decision on the significance of adverse impacts.

Environmental assessment process

The Review Board has heard from First Nations, community members, Elders, government organizations and members of the public. Parties raised various issues including:

- Impacts to water quality and aquatic life in Prairie Creek
- Management of tailings at the mine site
- Impacts to the ecological integrity of Nahanni National Park Reserve
- Impacts to the land and wildlife from operation of the winter access road
- Beneficial socio-economic impacts of the project for the region

The Review Board heard concerns from parties about potential impacts from the mine on water quality in Prairie Creek. In particular, Aboriginal Affairs and Northern Development Canada (AANDC), along with Parks Canada, Dehcho First Nations and Nahanni Butte Dene Band stressed the importance of setting water quality objectives in Prairie Creek that would protect the environment.

Water quality objectives

Canadian Zinc Corp. and AANDC proposed differing approaches to site specific water quality objectives for Prairie Creek. To achieve its proposed water quality objectives, Canadian Zinc Corp. made commitments to enhance its water treatment plant, increase water storage capacity and construct an improved mine effluent outfall for discharge into Prairie Creek. Based on an examination of the evidence, the Review Board is of the view that the implementation of either approach to site specific water quality objectives is not likely to significantly impact water quality in Prairie Creek in the area of the mine site, in Prairie Creek at the Nahanni National Park Reserve boundary, or in Prairie Creek at its confluence with the South Nahanni River.

Water storage and treatment

Parties described water storage and water treatment at the mine site as important project design components in protecting water quality. Canadian Zinc Corp. has committed to enhancing the water treatment plant. In addition, the developer has committed to increasing water storage capacity either by raising the dykes in the existing water storage pond or by constructing a second water storage pond. The Review Board is of the opinion that either option proposed by the developer for increasing water storage capacity on site will improve the project design and likely reduce impacts to receiving waters by allowing better treatment capabilities.

Tailings

With respect to tailings management, the developer commits to place all tailings underground as tailings paste backfill by the end of mine operations. The developer presented compelling evidence that this approach to tailings management can be achieved and will reduce impacts on water quality so that they are not likely to be significant.

Winter access road

The Review Board accepts the evidence from Canadian Zinc Corp. that construction and use of the winter access road will not have significant adverse impacts on the land, the water or wildlife along its route provided the developer's commitments are implemented. The Review Board suggests that the developer consider secondary containment of concentrate during transport along the winter access road to reduce the risk of contaminant dispersal.

Socio-economics

The Prairie Creek Mine project has broad support from First Nations and communities within the Dehcho Region. Impact Benefits Agreements have been signed between Canadian Zinc Corp. and the Nahanni Butte Dene Band and Liidlii Kue First Nation respectively. In the Review Board's view, socio-economic impacts and benefits are appropriately addressed through the Socio-economic Agreement between Canadian Zinc Corp. and the Government of Northwest Territories.

1 Introduction

This is the Mackenzie Valley Environmental Impact Review Board (Review Board)'s *Report of Environmental Assessment and Reasons for Decision* for Canadian Zinc Corp.'s proposed Prairie Creek Mine. The purpose of this report is to:

a) satisfy the reporting requirements of the *Mackenzie Valley Resources Management Act* (the Act) sections 121 and 128;
b) convey the Review Board's decision and rationale on whether the proposed development is likely to be the cause of significant adverse impacts on the environment or be a cause for public concern;
c) summarize the relevant evidence on which the decision is based; and
d) document relevant parts of the environmental assessment.

This Report of Environmental Assessment has four parts, as follows:

- **Section 1** sets out the requirements of the *Mackenzie Valley Resource Management Act* and provides a brief description of the development proposal. It also provides background information on the regulatory history and referral of this development to the Review Board.
- **Section 2** describes the Review Board's environmental assessment process for this project. It provides information about the parties to this assessment and the steps of the process the Review Board took to identify any significant adverse impacts or public concern as required by section 128 of the Act. Section 2 also describes the scope of the assessment and the changes to the proposed development's design that occurred during the assessment.
- **Section 3** outlines selected environmental components that the Review Board examined during the impact assessment. This section includes a summary of the evidence, the Review Board's analysis and conclusions, and any mitigations and suggestions by the Review Board.
- **Section 4** provides dissenting reasons submitted by Danny Bayha and Rachel Crapeau. These dissenting reasons do not form part of the Review Board's final decision.

1.1 Requirements of the *Mackenzie Valley Resource Management Act*

The Review Board administers Part 5 of the *Mackenzie Valley Resource Management Act* (the *Act*) and therefore has decision-making responsibilities in relation to the proposed development. The Review Board is responsible for conducting an environmental assessment that considers the proposed development's biophysical, socio-economic and cultural impacts on the environment, in accordance with section 114 and section 115 of the *Act*. The Review Board conducted this environmental assessment based on its *Rules of Procedure* and *Environmental Impact Assessment Guidelines*.

Under subsection 117(1) of the *Act*, the Review Board must decide on the scope of the development. The Review Board must also consider the factors set out in subsection 117(2), which are further described in Section 2 of this report. Although the parties have submitted evidence regarding a variety of impacts, the Review Board is required to conduct a particular test: to determine whether the proposed development is likely to cause a significant adverse impact on the environment or to be a cause of significant public concern.[1] The Review Board must then prepare a Report of Environmental Assessment.[2]

Once the federal and responsible Ministers accept the Review Board's Report of Environmental Assessment, the developer, government and regulatory authorities must ensure that any approved measure is carried out.[3] If the Review Board determines the development is not likely to have any significant adverse impact on the environment or be a cause of significant public concern,[4] the *Act* delegates the following:

- no regulatory authority can issue a license, permit or other authorization before the expiration of ten days after receiving the Report of Environmental Assessment from the Review Board;[5] and
- the federal Minister and Responsible Ministers may order an environmental impact review of the proposal, notwithstanding the Review Board's determination.[6]

1.2 Regulatory history

Canadian Zinc Corp. submitted the following Land Use Permit applications and Water License application to the Mackenzie Valley Land and Water Board in May and June 2008.

- MV2008L2-0002: Type A Water License, Prairie Creek Mine
- MV2008D0014: Type A Land Use Permit, Prairie Creek Mine
- MV2008T0012: Type A Land Use Permit, Liard Transfer Facility
- MV2008T0013: Type A Land Use Permit, Tetcela Transfer Facility

The Mackenzie Valley Land and Water Board notified the Review Board and other interested parties on July 14, 2008 that the applications were complete and that it had commenced its preliminary screening of the development. On August 8, 2008, Aboriginal Affairs and Northern Development Canada (AANDC) referred the Prairie Creek Mine development to environmental assessment. The referral was based on a request from the

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[1] Subsection 128(1)

[2] Subsection 128(2)

[3] Section 62 and subsection 130(5)

[4] Paragraph 128(1)(a)

[5] Subsection 129(a)

[6] Paragraph 130(1)(a)

Nahanni Butte Dene Band. The community believed the development might cause a significant adverse impact on the environment. On August 11th, 2008, the Review Board notified the developer that it had initiated an environmental assessment of the Prairie Creek Mine.

Request for Ruling – scope of development

The Prairie Creek Mine is located approximately 90 kilometres northwest of Nahanni Butte, in the southern Mackenzie Mountains on the east side of Prairie Creek. A winter access road to the mine site was originally established in 1981 and used to haul approximately 800 loads into the mine site from January to March in 1981 and 1982 (PR #255 p 53). The winter access road is currently permitted under land use permit MV2003F0028 to support exploration and clean-up around the mine site and runs east from the mine approximately 175 km to meet the Mackenzie Highway near Lindberg Landing. Canadian Zinc Corp. did not include the winter access road as part of applications for proposed development of the Prairie Creek Mine.

On November 3, 2008, the Review Board received a Request for Ruling from Ecojustice on behalf of the Dehcho First Nation and the Canadian Parks and Wilderness Society. The Request asked the Review Board to find that the existing land use permit for the winter road did not contemplate full scale mine operations and that construction and use of the winter road should therefore be included in the scope of the Prairie Creek Mine development. The request recommended the environmental assessment be postponed until after an application for a new land use permit for the winter road had been submitted by Canadian Zinc Corp.

In correspondence dated November 27, 2008, the Review Board informed the parties that it did not have the authority to require any developer undergoing an environmental assessment to apply for new regulatory authorizations or to replace existing permits. Instead, the Review Board decided that it would rule on the question of whether the scope of development should include the construction and use of the winter road.

In order to make an informed decision on scope of the development, the Review Board issued information requests to the developer and other parties asking for the submission of historic documents that may be relevant to the consideration of development scope for the project. Parties provided numerous background documents to the Review Board along with official submissions. These documents were placed on the public registry for the Review Board's consideration of the Request for Ruling.

On March 5, 2009 the Review Board found that the entire Prairie Creek Mine undertaking is subject to Part 5 of the *Mackenzie Valley Resource Management Act* and consideration of scope of development and scope of assessment are within the Review Board's discretion under s. 117 of the Act. The Review Board ruled that all physical works and activities associated with both the winter access road and the mine site are part of the scope of

development for the Prairie Creek Mine environmental assessment (PR#210). Accordingly, the Terms of Reference for the Prairie Creek Mine issued to Canadian Zinc Corp. in June of 2009, included the physical works and activities at the mine site as well as the winter access road in the scope of development for the project.

1.3 Environmental setting

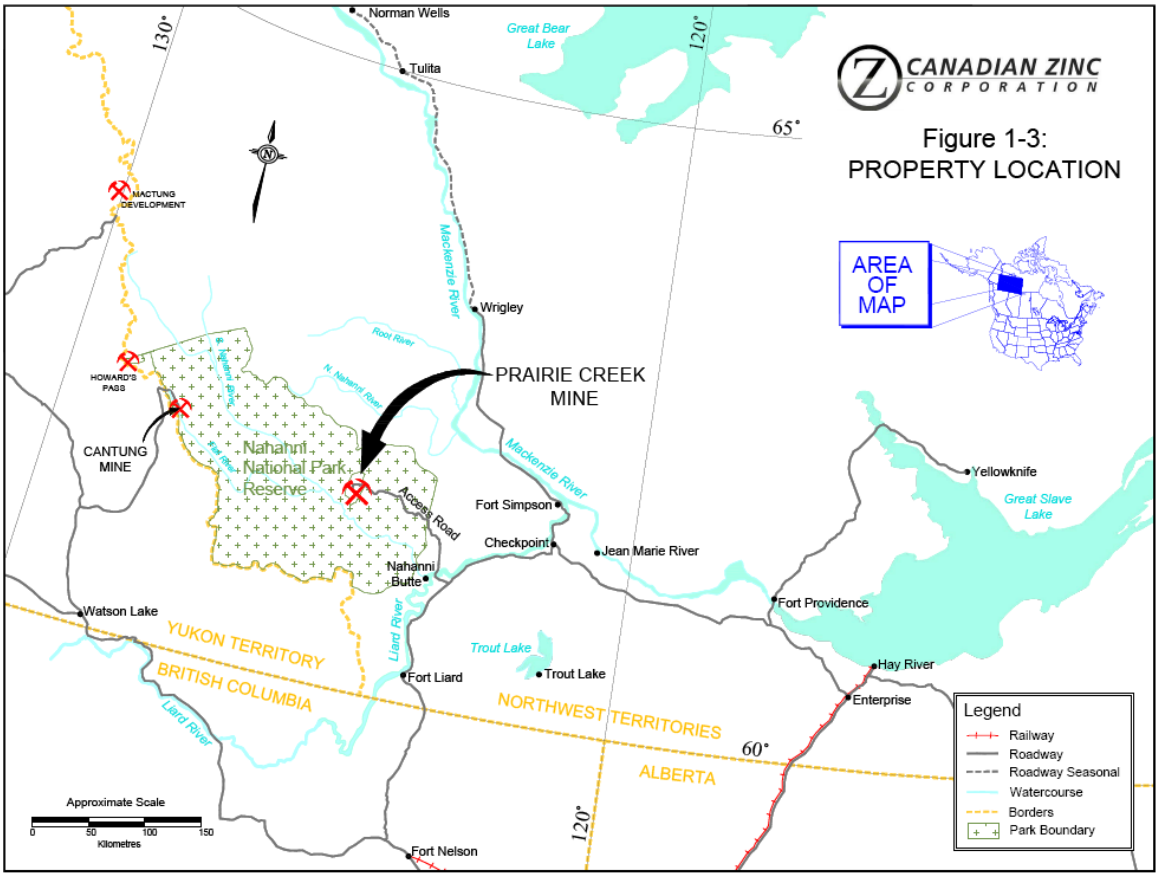


Figure 1: Map of the Prairie Creek Mine property location
Source: Prairie Creek Mine – Developer's Assessment Report (PR#255 p52)

The following description of the proposed development's biophysical setting is summarized from the information provided in Canadian Zinc Corp.'s Developer's Assessment Report. The mine site facilities are situated on the eastern side of Prairie Creek, about 43 kilometres upstream from where it flows into the South Nahanni River and seven kilometres upstream from the Nahanni National Park Reserve. The South Nahanni River flows into the Liard River about 100 kilometres downstream from Prairie Creek, near Nahanni Butte. The Liard River empties into the Mackenzie River at Fort Simpson a further 175 kilometres downstream. The mine site is situated at an elevation of 850 metres above

sea level and is located in the Boreal Cordillera Ecozone. The topography is characterized by low mountains and narrow valleys with an average relief of 300 metres. The mine site is located within the Alpine-Forest Tundra section of the Boreal Forest, characterized by stunted fir with limited undergrowth and open areas dominated by lichen.

The mine is connected to the Liard Highway through an existing winter access road (See Figure 2: Prairie Creek Mine Access Road). The winter road proceeds north from the mine up the Prairie Creek Valley for seven kilometres and then east across the Mackenzie Mountains. As the winter road gains elevation, it climbs into the alpine to a summit of 1,530 metres above sea level at kilometre 17 before dropping to the subalpine at 1,000 metres above sea level around kilometre 25. The route then passes through a spruce-lichen alpine forest zone similar to that found at the mine site and then into the Sundog Creek tributary valley bottom.

The winter road crosses the Ram Plateau into the Tetcela River valley, through the Fishtrap Creek wetland headwaters and over the Silent Hills into a closed mixed coniferous and deciduous forest. The existing alignment crosses black spruce muskeg and wetlands, before passing through mixed coniferous and deciduous parkland before climbing the Nahanni Range and the Grainger Gap at kilometre 117. The winter road then drops down over a closed shrub-open sedge meadow of the Grainger Tillplain and onto the Grainger River floodplain. The eastern portion of the winter access road crosses the Liard River on an ice bridge at kilometre 175 before meeting the Liard Highway (PR#255[7]).

Important wildlife species that can be found near Prairie Creek Mine include Dall's sheep, grizzly bear, woodland caribou and wolverine. The winter access road crosses or is adjacent to important habitat for Dall's sheep, woodland caribou, moose, wood bison, grizzly bears, wolverine, wolves, furbearers and varying small mammals, birds and waterfowl (PR#255 p 108-113).

The 1980 rainfall estimate for the Prairie Creek mine site was 300 mm/year. Recent climate data at Prairie Creek in 2006 indicate an annual rainfall total of 414 mm although it appears to have been an abnormally wet early summer. Snowfall depth is not available to make a comparison of total precipitation. Average mean daily temperatures for the year are around -5° C. The catchment area of Prairie Creek upstream of the mine is approximately 505.6 km^2 while the total Prairie Creek catchment is measured at 871.2 km^2 (PR#255). Mean flow for Prairie Creek at the confluence of the South Nahanni River in the peak flow month of June is 30 m^3/sec.

Bull trout and mountain whitefish are known to spawn in Prairie Creek upstream of the mine site and arctic grayling inhabit lower Prairie Creek. Harrison Creek does not provide

[7] This report references documents on the Public Registry with the initials PR followed by the registry number of the document and specific page numbers where appropriate. Appendix C provides a listing of the documents on the Public Registry by number.

useable fish habitat. The Nahanni Butte Dene Band has traditionally used the South Nahanni River and the mouth of Prairie Creek for harvesting fish and wildlife. Areas along portions of the winter access road have cultural importance and were traditionally used as travel corridors, with seasonal camps for harvesting furbearers and other wildlife (PR#255).

The Nahanni National Park Reserve was expanded to 30,000 km^2 in June 2009 and now completely encircles the Prairie Creek Mine (Figure 4: Nahanni National Park Reserve). However, the mine site itself and an area of approximately 300 km^2 around the mine are specifically excluded from the Nahanni National Park Reserve. These areas are not part of the expanded park. Beginning at the Prairie Creek Mine site, the winter access road enters the Nahanni National Park Reserve at kilometre 17 and leaves the eastern park boundary at kilometre 98 at Wolverine Pass in the Silent Hills (See Figure 2: Prairie Creek Mine Access Road). The *Canada National Parks Act* was amended specifically to allow for access to the Prairie Creek mine area.

1.4 Description of development

1.4.1 Prairie Creek Mine Site history

Canadian Zinc Corporation owns the Prairie Creek Mine. The development includes mine infrastructure and facilities constructed at the site in the early 1980's. Under a previous operator, the mine received a land use permit for mining and use of a winter access road in 1980 and a water licence for operations in 1982 to allow the production of lead and zinc and a silver-bearing copper concentrate. The mine was three months from production when it was placed into receivership due to market conditions. Operations did not commence and the milling of ore never occurred at the mine site (PR#255, p49).

Canadian Zinc Corp. was previously named San Andreas Resources Corp. and acquired the property in 1991 under that name. Since that time, Canadian Zinc Corp. has conducted surface and underground exploration at the site under several land use permits and presently has a water license for the purposes of underground decline development and operation of a metallurgical pilot plant. The pilot plant was not constructed, but a polishing pond for the secondary treatment of mine water effluent from the 870 portal was constructed in 2005 in accordance with the water licence. The Review Board has conducted environmental assessments of several exploration projects, including the underground development and the proposed pilot plant at the Prairie Creek mine over the past decade (PR#255, p53-55). Canadian Zinc Corp. currently holds a water licence (expires in 2013) and land use permit for underground development and operation of a pilot plant, a land use permit for surface exploration and a land use permit and water licence for use of the winter access road.

1.4.2 Existing infrastructure

The existing mine site and infrastructure at Prairie Creek was originally constructed in the early 1980's and the site was fully permitted for underground mining operations in 1982. All the site infrastructure and an airstrip are located on surface leases with the existing development located along the north-east side of Prairie Creek and extending up Harrison Creek. The existing footprint covers an area of approximately 65.5 ha (PR#343 App K p 3).

Existing site surface components at the mine include a mill concentrator complex, administration building, accommodation complex, maintenance workshops, fuel storage tank facilities, 12 hectare water storage pond, water treatment facilities, sewage treatment plant, waste rock dumps, a reagent storage pad, explosives magazine, an airstrip and ancillary site facilities. In addition, two camps and fuel caches exist along the winter access road, the Cat camp at kilometre 38 and the Grainger camp at kilometre 143. There are presently three levels of underground development at Prairie Creek; the 880 metre, 930 metre and 970 metre levels (all levels refer to metres above sea level). The 930 metre level is accessed from a portal on the Harrison Creek valley and contains over two kilometres of underground workings which connect to the lower level. The lower 880 metre level is accessed from the 870 portal which is located near the mill complex. It is accessed by rail tracks and has over one and a half kilometres of underground development (PR#255 p 163-176).

1.4.3 Proposed development – Underground mine

The Prairie Creek mine is a base metal deposit consisting of vein and stratabound mineralization contained in limestone, dolostones and shales. The current resource the developer wants to mine totals over five million tonnes, containing lead, zinc, silver and copper in vein and stratabound ore. The planned lifespan of the mine is fourteen years. All mining will be underground and the mine will initially produce 600 tonnes of ore per day, up to a maximum of 1,200 tonnes per day, operating year round.

The ore mined above the 880 level underground will be accessed from the existing 870 portal and will continue to use the existing tracked haulage. The developer will extend the track the full strike length of the 880 level for mining the upper level over the life of the mine.

Mine development will require one additional portal at the same location but to the west of the current 870 level portal. The new 870 level portal will provide access to the lower portions of the mine and will use trackless equipment. The developer will excavate an area for a maintenance shop and garage along with a fuelling facility adjacent to this new haulage route. The primary development for the lower portions of the mine will be a ramp at -15%, 4.3 meters high and 4.5 metres wide to accommodate 20 tonne capacity trucks and service vehicles. The ramp will proceed down to the 800 level and continue

development to the 720 level and 640 level where access to the stratabound ore in addition to vein ore will occur.

Ventilation for the underground mine will be required at both 870 level adits and exhaust fans will be located at the 930 level adit. Sumps and permanent pumping stations on various levels will first settle sediment from mine water and then pump the water to the 880 level to take it out of the mine to the surface. An ore storage bin will be located inside the 870 level portal and a conveyor will transport ore outside the mine.

1.4.4 Proposed development – Mine Surface facilities

The present proposal for mining operations takes advantage of existing facilities. However, there have been technological advances in the mining and mineral processing industry in the last 30 years and some facilities will require upgrades or replacement. In the mill, there will be a need for some equipment, electrical, pumping, piping and safety upgrades related to optimizing the milling process and bringing the operation up to present standards and codes.

In the mill, the ore will be processed to separate metal bearing minerals (concentrates) from waste (tailings). The ore will first be crushed to a gravel size and the metal bearing rock will then be ground down to flour in a ball mill. It will be further processed in floatation cells. A lead carbonate floatation circuit will be added to increase overall metal recovery and will be installed alongside the existing floatation circuits. The process will produce concentrates of lead and zinc (each containing silver and copper). A new concentrate bagging plant will be located on the south side of the mill. The developer will place concentrate in sealed bags and store the concentrate in a new storage building capable of storing 70,000 tonnes of concentrate (PR#255 p170-171).

An important modification to the mill process will be the installation of a dense media separation (DMS) plant to be located adjacent to the north wall of the mill and joined to the existing crushing circuit. The plant will reject light weight un-mineralized rock using ferrosilicon to achieve separation. The developer will build a storage pad for overflow from the DMS plant with a capacity of 10,000 tonnes. Approximately three-quarters of the DMS rock will be used to feed the paste backfill plant and the remainder will be trucked to the waste rock pile (PR#255 p 196 & 199).

The production of paste backfill will take place in a new past backfill plant located on the north side of the mill next to the new DMS plant. The paste will combine DMS rock with floatation tailings and cement as a binder. The paste backfill will be transported by truck or pumped via pipeline underground to fill mined out voids. Canadian Zinc Corp. proposes to place all of the floatation tailings and 75% of the DMS rock underground as paste backfill. During the initial five months of mine development, underground voids will not be available for placement of paste backfill. About 50,000 tonnes of tailings will require temporary storage during this time. The developer will have to place 10,000 tonnes in a

heated building beside the concentrate shed and the remaining tailings will be stored temporarily in the water storage pond. These tailings will be reclaimed later by pumping a slurry back to the mill and paste backfill plant for ultimate placement underground (PR#255 p 199-200).

Waste rock from underground will be placed permanently in a waste rock pile located 400 metres north of the 930 level portal on a north-west slope in the Harrison Creek valley. Approximately 277,000 m^3 of development waste rock and 163,000 m^3 of DMS rock will be placed in the waste rock pile for a total of 440,000 m^3 (PR#255, p 196). A solid waste landfill with an incinerator cell will be located on the waste rock pile and will include a location for inert waste, sewage sludge and a landfarm for contaminated soil.

Because of past concerns with the integrity of the existing water storage pond and stability of the back slope above the pond, Canadian Zinc Corp. proposes to reconfigure the water storage pond. The developer will construct a submerged berm in the pond along with a toe buttress to stabilize the slope. The developer will also place a new geosynthetic liner in the pond to minimize leakage. The pond will be divided into two cells and will hold both mine water effluent and mill process water effluent prior to treatment in the new water treatment plant. Canadian Zinc Corp. will build the top of the dyke surrounding the water storage pond to an elevation of 881 metres. During mine operations, the water elevation range is 877 metres to 880 metres providing a one metre allowance for freeboard.

During operations, the proposed water management strategy will make use of the existing water storage pond and a new water treatment plant. Mine water and a portion of the mill process water effluent will be stored in the water storage pond and recycled as feed water for the mill process. Other effluent water from the waste rock pile, DMS pile, ore stockpiles and the sewage treatment plant will also be pumped to the water storage pond. The mill process water effluent stream that is directed to the water storage pond will make use of residency time in the separate cells in order to dilute organic reagent residues (which are chemicals used in the mill) prior to re-use in the mill. The water treatment plant will treat mill process water that is not recycled through the mill as well as mine water, to reduce metal and contaminant concentrations.

The water treatment plant will have two treatment circuits. Underground mine water will be treated with lime to raise the pH followed by pH reduction using sulphuric acid. Treatment of mill process water will involve acidification to pH 5 using sulphuric acid followed by the addition of sodium sulphide, iron, lime and a flocculant, used for settling and clarification. The treated water streams will then merge for a water clarification step before discharge into the lined catchment pond and ultimately into Prairie Creek (PR#255 pp214-15).

In order to meet proposed effluent discharge criteria, mill process water will be treated and released into Prairie Creek only during months of high stream flows with greater dilution rates. Water levels in the water storage pond will therefore be drawn down in the

summer and rise between December and April because process water will be stored during the low flow season. During February and March, only underground mine water will be treated and released to Prairie Creek and water in the water storage pond correspondingly will rise.

Power for all mine requirements will be from five new fuel efficient, low emission Caterpillar diesel generators. A glycol based heat recovery system will be installed to heat various site facilities. Diesel fuel consumption at the mine site is estimated at 6.5 million litres. The existing four fuel tanks in the tank farm have a combined capacity of approximately 6.8 million litres (PR#255 p221).

Other proposed new developments at the mine site include cement and reagent storage buildings, two 180,000 litre sulphuric acid storage tanks, a new kitchen, accommodation block and new explosives magazines.

The existing airstrip will receive air traffic three to four times per week for both supplies and people. The 1,000 metre length and topographical constraints of the airstrip limit its use to medium sized aircraft (DHC-5 Buffalo, Twin Otter, Dash 7-100, Hawker Sidley 748).

1.4.5 Proposed development – Road

The existing winter access road was constructed in the early 1980's and operated for two winter seasons during original mine construction. Following consultations with Parks Canada and the Nahanni Butte Dene Band, Canadian Zinc Corp. proposes winter access route re-alignments for environmental and cultural reasons. The re-alignment alternatives are shown on Figure 2: Prairie Creek Mine Access Road and are briefly described below.

The proposed Polje By-pass is within the Nahanni National Park Reserve at kilometre 48 to 59 and is intended to avoid karst features (which include sinkholes and dissolving carbonate bedrock), steep gradients and reduces the number of creek crossings. The Silent Hills alternative at kilometres 90 to 99 is also within the Nahanni National Park Reserve and eliminates a steep gradient with tight switchbacks up Wolverine Pass to makes the route safer. Nahanni Butte Dene Band requested the Wolverine Pass-Grainger Gap alternative from kilometre 99 to 118 because it avoids passing through wetlands. The Nahanni Front Range alternative from kilometre 125-170 avoids wetlands that support wildlife and joins the Nahanni Butte all season road near the community and does not pass through Lindberg Landing. This route is also preferred by the Nahanni Butte Dene Band (PR#255 pp224-228).

The winter access road to the Prairie Creek Mine has not been used since 1982. Sections of the route are overgrown with vegetation and will need to be cleared along with the alternative route sections. The Liard River will be crossed on an ice bridge and creeks along the route will be crossed with snow fills or temporary span structures. Construction and operation of the route will occur seasonally during the winter months.

The developer expects the concentrate haul between the mine and the transfer stations along the winter access road to be in the range of 70 trucks per day for a total of 120,000 tonnes of concentrate transported to the Liard Highway each winter when mine production is at full capacity. Incoming fuel and mine operating supplies along the access road are estimated at 10 trucks per day during the winter operating period (PR#255 p 231).

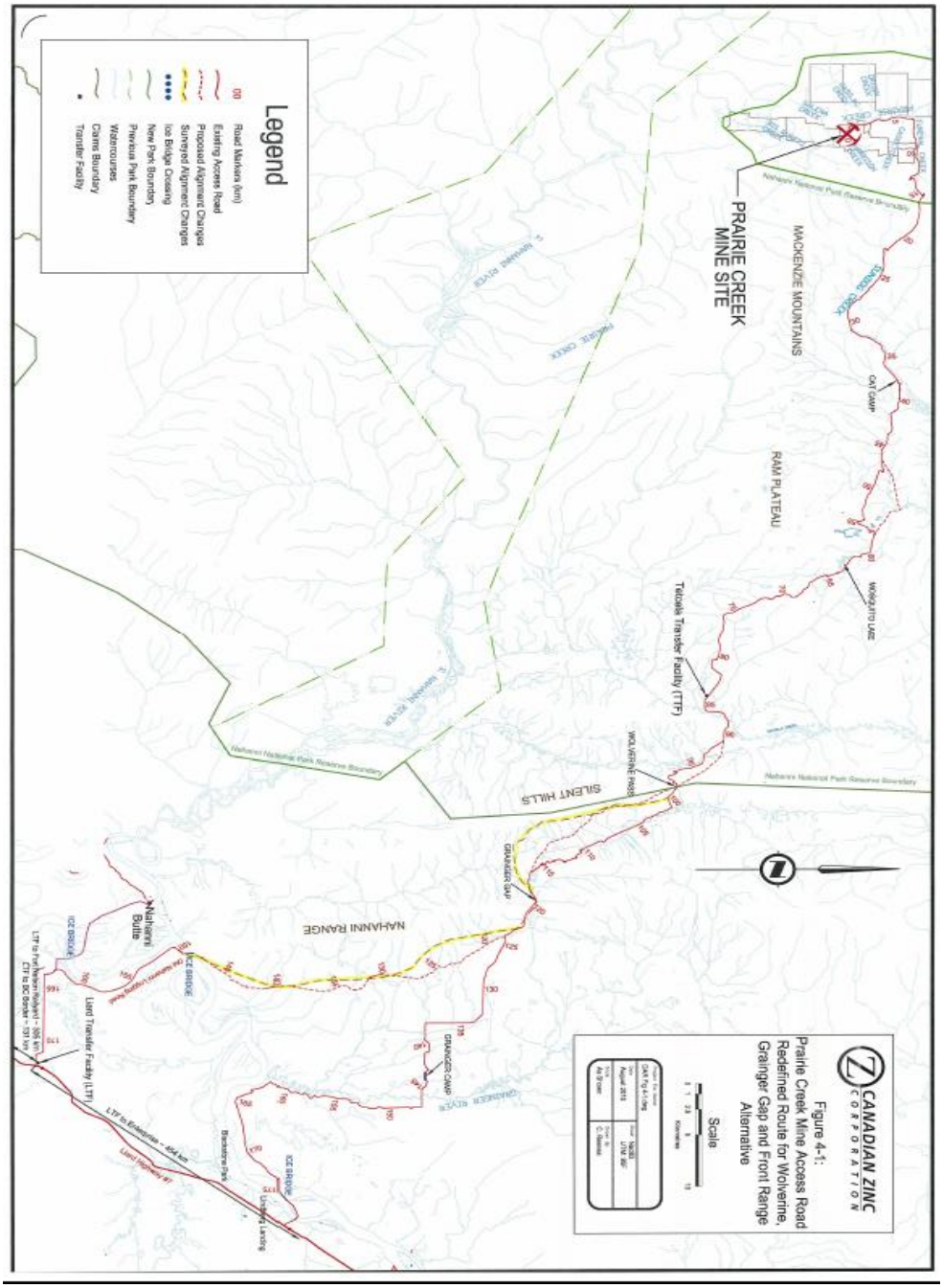


Figure 2: Prairie Creek Mine Access Road
Source: Prairie Creek Mine –Responses to Information Requests, Appendix E (PR#293, p5)

1.4.6 Transfer Facilities

The developer proposes two concentrate transfer facilities along the access road, one at kilometre 84 called the Tetcela Transfer Facility and another near the junction of the Liard Highway known as the Liard Transfer Facility. The Tetcela Transfer Facility will consist of two unheated concentrate storage structures and will operate from December through March each year. The purpose of the Tetcela Transfer Facility is to store bagged concentrate transported from the mine early in the winter each year once the western portion of the winter road is constructed. When the eastern portion of the winter road is completed in mid-January the stored concentrate will be trucked to the Liard Highway.

The Liard Transfer Facility will be located either near Lindberg Landing if the original winter route is chosen or on the Nahanni Butte access road if the alternative route is built. The Liard Transfer Facility will also have concentrate storage structures and will receive concentrate shipments from mid-January through mid-March. Concentrate will proceed from there along the Liard Highway to Fort Nelson. In addition, the Liard Transfer Facility will store fuel and mine operating supplies for transport to the mine. Both the Tetcela Transfer Facility and Liard Transfer Facility will have day-use trailers for use seasonally by a small number of operating personnel.

1.4.7 Manpower

Approximately 120 people will be needed during initial mine construction and modernization. During the operations phase, the mine will require a total of 220 personnel with 110 on-site at any given time. Canadian Zinc Corp.'s policy is to maximize the employment of First Nations people as well as northern residents. Personnel will work for three weeks followed by three weeks off and will be transported to and from the mine by aircraft.

1.4.8 Development Phases and Schedule

Once permitting and financing is in place, construction of the access road, transfer facilities, mine facilities and underground workings will start and take one year to complete. Operations will begin in year two and continue for 14 years. Once operations cease, mine closure, reclamation and post-closure monitoring will continue for 10 years. (PR#255 p161).

2 Environmental assessment process

This section describes the Review Board's environmental assessment process for this project. It provides information about the parties to this assessment and the steps of the process the Review Board took to identify any significant adverse impacts or public concern. This section also describes the scope of the assessment and the changes to the proposed development's design that occurred during the assessment.

2.1 Parties to the environmental assessment

Twelve parties participated in this environmental assessment. According to the Review Board's *Rules of Procedure*, the developer is a registered party. The other registered parties were:

- Nahanni Butte Dene Band
- Liidlii Kue First Nation
- Dehcho First Nation
- Department of Fisheries & Oceans
- Government of the Northwest Territories
- Aboriginal Affairs and Northern Development Canada
- Environment Canada
- Transport Canada
- Parks Canada
- Natural Resources Canada
- Canadian Parks and Wilderness Society

During the environmental assessment process, representatives of government departments and other interested groups had the opportunity to identify their interests and to notify the Review Board of their intent to participate in the proceeding as an interested party. Parties to the environmental assessment had the opportunity to attend and actively participate in the process. Though some parties did not actively participate in all the stages, all information exchanges between the developer and parties can be found on the public registry. Table 1 below illustrates the involvement of the parties throughout this environmental assessment process, including information request responses and the public hearing.

Table 1: Participation of the parties

Party	Information requests, technical sessions (Yellowknife)	Hearing
Nahanni Butte Dene Band	✓	✓

Party	Information requests, technical sessions (Yellowknife)	Hearing
Liidliii Kue First Nation	✓	✓
Dehcho First Nations	✓	✓
Fisheries & Oceans Canada	✓	✓
Government of the Northwest Territories	✓	✓
Aboriginal Affairs and Northern Development Canada	✓	✓
Environment Canada	✓	✓
Transport Canada	✓	✓
Parks Canada	✓	✓
Natural Resources Canada	✓	✓
Canadian Parks and Wilderness Society	✓	

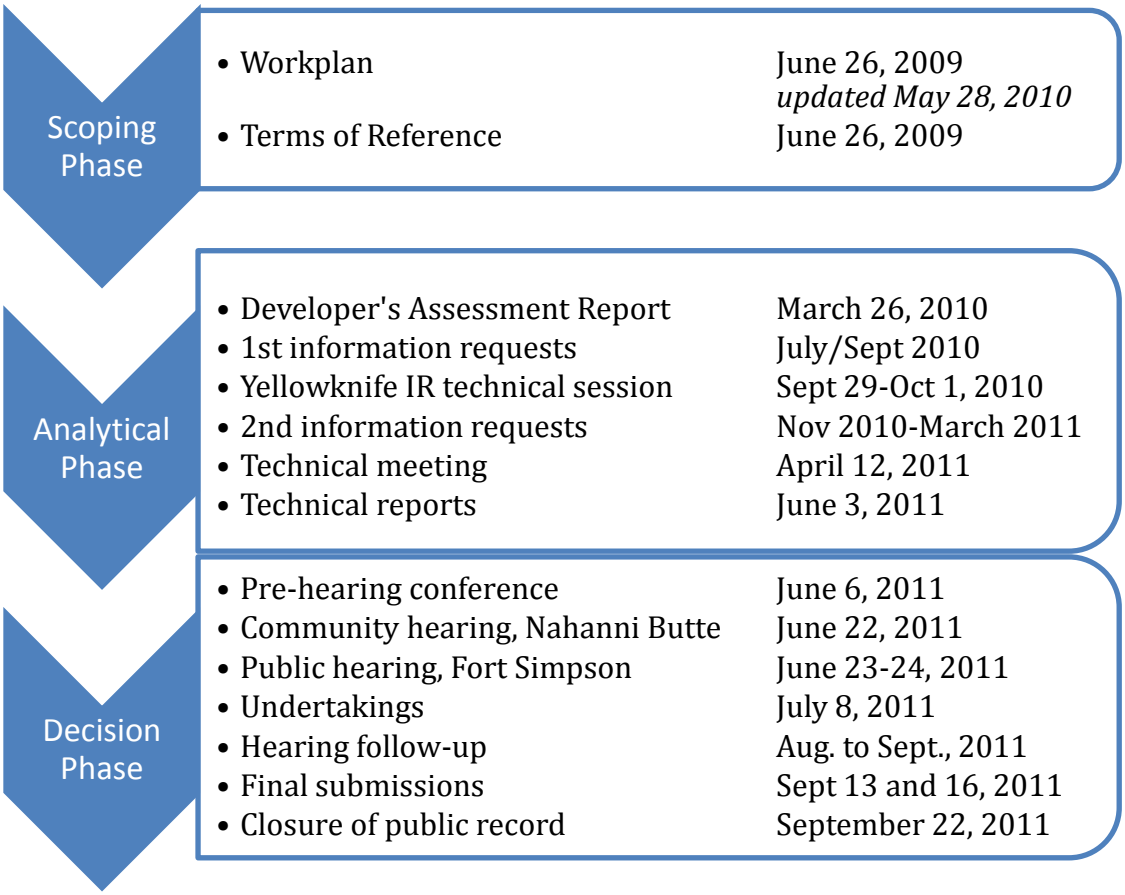
✓ = actively participated in this phase of the environmental assessment

The *Terms of Reference* for the Developer's Assessment Report outlined the parties' roles and responsibilities. The developer was responsible for producing the information necessary for the Review Board and the parties, to evaluate the potential impacts that the proposed project might have on the environment.

2.2 Environmental assessment phases

After the referral in August 2008 and the initial start-up activity such as creating a distribution list, the Review Board conducted this environmental assessment in three phases: a scoping phase, an analytical phase, and a decision phase. See Figure 3: Prairie Creek Mine environmental assessment process for tasks associated with each phase of the environmental assessment.

Figure 3: Prairie Creek Mine environmental assessment process



2.2.1 Development of Work Plan and Terms of Reference

The Review Board issued a draft Work Plan in May 2009. This document established milestones and identified the Review Board's timelines and expectations for the completion of the environmental assessment. Parties to the environmental assessment submitted comments on the draft Work Plan during June 2009. After considering these comments, the Review Board issued the final Work Plan at the end of June 2009. The Review Board revised the Work Plan in May 2010 to reflect changes to the Developer's Assessment Report submission date.

The Review Board issued the draft Terms of Reference to the distribution list for comment, also in May 2009. The Review Board considered all comments from parties and issued the final Terms of Reference in June 2009. The Terms of Reference defined the scope of development, the scope of assessment and provided direction to Canadian Zinc Corp. and the parties about their roles and responsibilities in the environmental assessment process.

2.2.2 Developer's Assessment Report

Canadian Zinc Corp. submitted its Developer's Assessment Report according to the Terms of Reference in late March 2010. After receiving the Developer's Assessment Report (PR# 255) the Review Board issued a deficiency statement to Canadian Zinc Corp. requesting specific information from the Terms of Reference that the developer had not addressed in the Developer's Assessment Report. Canadian Zinc Corp. responded to the deficiency statement with an Addendum and in May 2010 the Review Board decided that the Developer's Assessment Report with the Addendum was in conformity with the Terms of Reference.

2.2.3 Information requests and technical sessions

In June 2010, the Review Board asked parties to provide their written information requests on questions and clarifications with the Developer's Assessment Report. The Review Board issued all of the information requests submitted by parties to Canadian Zinc Corp. in July with the provision that the Review Board did not endorse any of the information requests. Canadian Zinc Corp. was requested to provide reasons to the Review Board in the event that they could not answer a given information request. In September, 2010, Canadian Zinc Corp. provided a document with responses to the information requests.

On September 29 to October 1, 2010, Review Board staff hosted a three-day technical session in Dettah so that parties to the environmental assessment could seek clarification on responses to the information requests and discuss remaining issues face to face with Canadian Zinc Corp. representatives and their consultants.

Following the technical session, the Review Board gave parties the opportunity for a second round of information requests focused on issues that remained unresolved from the technical session. Canadian Zinc Corp. submitted responses to the second round of information requests in March 2011.

At the request of parties, the Review Board held another focussed but informal technical session in Yellowknife on April 12, 2011 to discuss project design modifications and to allow parties to meet face to face with the developer and ask questions on unresolved matters. After the technical session, the Review Board set a deadline for parties to submit their final technical reports. The Review Board also set out a public hearing schedule.

2.2.4 Pre-hearing conference

Review Board staff hosted a pre-hearing conference on June 6, 2011 and invited parties to participate by tele-conference. The purpose was to discuss hearing procedures and to set an agenda for public hearings in Nahanni Butte and Fort Simpson.

2.2.5 Public hearings

On June 22, 2011, the Review Board held a community hearing in Nahanni Butte and on June 23 and 24 the Review Board held a public hearing in Fort Simpson. Radio, posters, newspapers and webpage announcements notified the public prior to the hearing. The main purpose of the hearing was to allow the public an opportunity to hear and participate in a discussion of the issues related to the proposed development during the environmental assessment. The hearing was an opportunity for the community members to bring up important concerns directly to the Review Board.

The developer and several other parties gave presentations to the Review Board. All parties had the opportunity to question both the developer and the other parties involved. The parties highlighted direct and indirect impacts of the proposed development and presented final impact predictions and mitigation suggestions to the Review Board.

2.2.6 Hearing follow-up, final submissions and closure of the public record

During the hearings, the Review Board required the submission of undertakings from the developer and other parties. Responses to these undertakings were submitted to the Review Board on or before July 8, 2011.

The primary remaining issue at the Prairie Creek Mine following the public hearings was site-specific water quality objectives. AANDC, Canadian Zinc Corp. and other parties held meetings to try and resolve differing viewpoints on water quality objectives. In order to move closer to an agreement on a site specific water quality objectives Framework, Canadian Zinc Corp. made a commitment to increase water storage capacity at the site to better meet water quality objectives and conducted a desk study of process water treatment options.

On August 16, 2011 Parks Canada submitted a Request for Ruling to the Board to require the developer to describe and assess the impacts of water storage pond options and tailings storage. On August 17, the Review Board asked parties to comment on that portion of the Request for Ruling specific to water storage pond options. Canadian Zinc submitted information on water storage pond options before the Request for Ruling comment period was over. As a result, the Review Board dismissed the Request for Ruling but granted an extension to the final submission deadline to give parties a chance to review the new information.

The Review Board accepted final submissions from parties on September 13, 2011 and final submissions from Canadian Zinc Corp. on September 16, 2011. The Review Board closed the public record on September 22, 2011.

2.2.7 Environmental assessment decision

After the closing of the public record, the Review Board deliberated on the evidence. The Review Board considered all submissions on the public record in its decision. The Review Board has prepared this *Report of Environmental Assessment & Reasons for Decision* for submission to the Minister of Indian Affairs and Northern Development as required by subsection 128(2) of the *Mackenzie Valley Resource Management Act*.

2.3 Decisions on significance

Section 128 of the *Mackenzie Valley Resource Management Act* requires the Review Board to decide, based on all the evidence on the public record, whether or not in its opinion the proposed development will likely have a significant adverse impact on the environment or be a cause for significant public concern.

During the course of the environmental assessment, the Review Board asked the registered parties to assist by providing their own views of the predicted impacts and their significance. The Review Board considered the following characteristics of all environmental impacts identified:

- magnitude
- geographic extent
- timing
- duration
- frequency
- nature of the impact
- reversibility of the impact
- probability of occurrence
- predictive confidence level

Section 3 of this report describes the Review Board's analysis and the reasons for its decisions on the significance of adverse impacts that are likely to result from the proposed development.

In addition, the *Mackenzie Valley Resource Management Act* paragraph 128 (1)(c) requires the Review Board to identify whether the proposed development is likely to be cause of significant public concern. Because this project was referred to environmental assessment on the basis of the potential for significant adverse impacts on the environment and not because of public concern, the Board focused on impacts of the project on the environment.

2.4 Scope of development

The scope of development outlined in this Report of Environmental Assessment describes the elements of the proposed project that the Review Board considers in the environmental assessment. The scope of development identifies and takes into account both principal and accessory development activities. It also outlines activities within this scope of development that will occur under the land use permit, water license or other regulatory

instruments. These activities cannot exceed the scope of environmental assessment without requiring further preliminary screening.

The scope of development was initially based on the water licence application and three land use applications submitted by Canadian Zinc Corp. to the Land and Water Board during preliminary screening. This was the scope of development included in the *Terms of Reference* issued by the Review Board in July 2009. The scope of development was subsequently altered on several occasions during the course of the environmental assessment to reflect changes that Canadian Zinc Corp. made to the project. Section 2.4.1 describes some of the more important changes. The scope of development identified in section 2.4.2 includes all relevant changes and in the Review Board's opinion accurately reflects the Prairie Creek Mine project as currently proposed.

2.4.1 Development description amendments

The developer proposed several beneficial project modifications during the analytical phase of the environmental assessment which modified the scope of development and its potential impacts on the environment. A summary of the key project modifications is set out in Table 2 below.

Table 2: Beneficial modifications to the development description

Original Developer's Assessment Report component	Alternative chosen component	Benefits of chosen alternative in relation to the likelihood of significance of adverse impacts
Temporary storage of tailings: 10,000 m^3 to be stored on land adjacent to concentrate shed and 50,000 m^3 in water storage pond	Tailings temporarily stored in water storage pond only. Volume of 50,000 m^3 may be exceeded during operations with approval by inspector	• There will be no temporary storage of floatation tailings on surface other than in water storage pond • Paste tailings will only be stored on surface in the paste backfill plant
Outfall of mine effluent into Prairie Creek with diffuser	Outfall of mine effluent via pipe(s) below stream bed in an exfiltration trench	• Effluent flow possible during low creek flow • Effluent mixing is improved in creek • Design resilient to changes in stream channel morphology

Original Developer's Assessment Report component	Alternative chosen component	Benefits of chosen alternative in relation to the likelihood of significance of adverse impacts
Water storage capacity in existing water storage pond	Increase in water storage capacity by raising dykes in existing pond or building a second water storage pond	• Ability to store water and not discharge during the low flow months in Prairie Creek • Longer residency time benefits chemistry of process water • Reduces risk of water treatment plant upsets, site, paste backfill scheduling problems and other malfunctions at the mine site • Greater capacity to store temporary tailings during operations phase
Winter road re-alignments	Re-alignments modified to avoid ice-rich ground	• Kilometres 48 to56.5 – avoids karst area • Kilometres 94 to 101 – reduces safety risk on steep slope • Kilometres 102 to 155 – moved closer to Nahanni Butte in order to monitor road usage
Water treatment plant lime/ferric sulphide	Enhanced water treatment options commitment	• Treatment of process water will be improved by either enhancing current system or adopting a precipitation ion exchange system

The Review Board has accepted Canadian Zinc Corp.'s rationale for the project modifications and the scope of development has been changed based on these project modifications. This *Report of Environmental Assessment* is based on the scope of development for this project as defined in this document. The Review Board's conclusions about the impacts of the Prairie Creek Mine and section 128 *Mackenzie Valley Resource Management Act* determination are based on the inclusion of these design changes in the scope of development.

The Review Board finds that the modifications to the project description are likely to decrease the potential adverse impacts of the proposed development on the environment. In particular, design modifications related to increased water storage capacity and enhancements to the water treatment plant are important in the Review Board's findings.

As a result of modifications to the scope of development, the Review Board is confident that it has enough evidence on the record to make a decision on the significance of adverse impacts from the project to the environment. Portions of the March 2010 Developer's Assessment Report are out of date as a result of these project design modifications that Canadian Zinc Corp. adopted into the scope of development during the environmental assessment. The following section discusses the final scope of development.

2.4.2 Final scope of development

The Review Board identified the principal scope of development to include those components in Table 3 below, after reviewing the evidence submitted by the developer during the course of this environmental assessment. Changes made by Canadian Zinc Corp. during the course of the environmental assessment are indicated in bold**.**

Table 3: Final scope of development

Phase	Components/Activities
Construction	Upgrade existing mine facilities including mill concentrator complex, powerhouse generators, maintenance workshops, administration building, accommodations, kitchen, sewage treatment plant, explosives magazine, fuel tanks, water storage pond and catchment pond
	Construction of new mine facilities including DMS plant, temporary DMS rock storage pad, paste backfill plant, concentrate bagging plant, concentrate storage shed, water treatment facility, exfiltration trench effluent outfall, sulphuric acid storage tanks, reagent storage sheds, cement batch plant, ore storage facility, waste rock pile, solid waste facility with incinerator and ancillary mine facilities
	Re-design and construction of existing water storage pond and catchment pond
	Create additional water storage capacity either by raising the dykes in the existing water storage pond or by building a second water storage pond
	Construction of underground facilities including a new 870 level portal with access ramp to lower mining levels, ventilation and exhaust fans, sumps and pumping stations, ore storage bin and underground maintenance shop
Operations	Underground mining and milling of ore including crushing dense media separation, grinding and floatation
	Production of lead concentrates and zinc concentrates, bagging and storage in concentrate shed until the winter haul season
	Operation of paste backfill plant, DMS plant and concrete batch plant for the production of tailings paste backfill and transport of paste underground for placement
	Operation of water treatment facility, sewage treatment plant, solid waste facility, water storage pond, catchment pond, waste rock pile and associated seepage collection pond

Phase	Components/Activities
	Operation access roads, storage areas and other mine facilities required for the day to day workings of the mining project
	Management of hazardous and non-hazardous materials and wastes
Water management	Collection of contaminated water from underground, rock waste pile seepage pond, sewage treatment plant and ore stockpile for transfer to water storage pond
	Operation of existing water storage pond including recycling of mill process water
	Temporary storage of tailings in water storage pond
	Construction and operation of water treatment plant and **discharge of treated water into Prairie Creek via an exfiltration trench**
	Adopt one of two approaches to improving a proposed water treatment plant either by enhancing the sulphide-lime precipitation by adding filtration or by following the sulphide-lime pre-treatment with filtration and ion exchange
	Withdrawal of potable water from mine-site wells in the Prairie Creek aquifer
	Monitoring of water quality and quantity
Transport	Re-establishment of existing 180 km winter road from the mine site to the Liard Highway including **construction of 3 route re-alignments that total approx. 63 km**
	Construction and use of the Tetcela transfer facility for concentrate storage and handling at km 84.5 of the access route and a second transfer facility at the Liard Highway for the storage and handling of concentrate as well as incoming fuel and mine supplies
	Construction and operation of the annual winter access road during frozen ground conditions seasonally for 14 year mine life to haul concentrate from mine out to Liard Highway and haul fuel and other mine supplies from the Liard Highway to the mine site
	Upgrade and use of the existing 1,000 m length gravel airstrip located at the mine site for transport of people and supplies
	Construction and operation of gravel pits and borrow sites along the winter access road
	Water withdrawal from locations along the winter access road including the wells at the mine, Mosquito Lake, Gap Lake and the Liard River
Closure and reclamation	Closure and reclamation of mine site components and winter access road

2.5 Scope of environmental assessment

The scope of the environmental assessment identifies which issues and items the Review Board will examine during the process. The Review Board recognized that the Mackenzie Valley Land and Water Board referred this environmental assessment, and therefore the

Review Board developed the scope of assessment with public concern in mind as well as factors listed under subsection 117(2) of the *Mackenzie Valley Resource Management Act.*

After considering the relevant information available on the public record, the Review Board made decisions on the scope of the assessment. When assessing social and cultural impacts the geographical scope of this assessment included Northwest Territories communities that have traditionally used the area. The Review Board had to consider the entire proposed project area to assess the development-specific and public concern issues. The geographic scope of the assessment included the communities of Nahanni Butte, Fort Simpson, Fort Liard and Wrigley, the areas they use and vicinity of the proposed project in general. The Review Board established the temporal scope to include all phases of the mine development, including:

- construction of new mine facilities and road re-alignments (2 years)
- mine operations (14 years)
- Closure activities (1 year)
- Post-closure monitoring (to be determined in Closure and Reclamation Plan)

Valued components

The Review Board identified the following potentially affected valued components for the *Terms of Reference*:

Key line of inquiry

- Mine site water quality

Subjects of note (biological)

- ecological integrity of Nahanni National Park Reserve
- water quality along access route
- fish and aquatic habitat
- air quality
- wildlife and wildlife habitat
- terrain and access
- vegetation

Subjects of note (socioeconomic)

- employment and business opportunities
- distribution of beneficial and adverse socio-economic impacts
- social impacts
- cultural impacts
- traditional land use and wildlife harvesting
- heritage resources
- closure and reclamation

Traditional knowledge

The Review Board recognizes the important role that Aboriginal cultures, values and knowledge play in its decision-making. In accordance with the requirements of subsection 115(1) of the *Mackenzie Valley Resource Management Act*, the Review Board considered all traditional knowledge that parties shared during the environmental assessment.

Nahanni Butte Dene Band prepared a traditional knowledge assessment in 2009 and submitted the addendum document, including confidential sections, to the Review Board (PR#245). The Review Board gave due consideration to the traditional knowledge study submitted by Nahanni Butte Dene Band including the confidential portions.

The traditional knowledge assessment provided an overview of traditional land use and cultural activities in the Nahanni River Valley and surrounding area. Traditional values that could be impacted by the Prairie Creek Mine development and access were described and recommendations to address concerns were submitted (PR#388 p3-4). Elders from Nahanni Butte Dene Band were involved throughout the study.

Canadian Zinc Corp. received a copy of the traditional knowledge assessment from Nahanni Butte Dene Band and incorporated portions of the information and recommendations into its Developer's Assessment Report (PR#255 p151-152, 158-159). The proposed re-alignment of the winter access road between Grainger Gap and the Liard River (km 125-170) in particular was a result of recommendations resulting from information gathered through the traditional knowledge assessment.

3 Assessment of impacts

This section of the report considers specific issues related to impacts that arose during the environmental assessment. All information is based on material from the public record. For each issue the Review Board describes:

- the developer's submissions and predictions (based on the *Developers Assessment Report,* response to information request documents, hearing statements, final submissions and other evidence from Canadian Zinc Corp. on the public record);
- other relevant items on the public record (such as submissions from parties to the environmental assessment);
- the analysis and conclusions of the Review Board pertaining to each issue; and
- any measures or suggestions by the Review Board.

The Review Board has considered all issues that parties and the public raised in this environmental assessment, pursuant to the requirements of s.117 of the *Mackenzie Valley Resource Management Act*. The Review Board considered evidence from the hearings as well as written evidence on the public record. This report does not discuss issues which the Review Board has decided are fully resolved by the material on the public record.

The only issues discussed in detail in this *Report of Environmental Assessment* are those that the Review Board decided warranted further consideration for the purposes of its decision under section 128 of the Act. The Review Board notes that within the framework of the Act, the significance determinations described in this report are not intended to limit regulators from drawing their own conclusions when carrying out their regulatory duties.

The outstanding issues addressed in this section of the report involve impacts to water quality, water management and storage, impacts to the Nahanni National Park Reserve from winter access road construction and operation, impacts to wildlife and socio-economic issues. The Review Board considered the evidence in the project-specific context and in the cumulative context where appropriate.

An important note about commitments made by Canadian Zinc Corp.

Commitments made by Canadian Zinc Corp. during the course of this environmental assessment form an integral part of the Prairie Creek Mine project and are part of the scope of development. In particular, the Review Board finds the commitments the developer made for specific project design modifications to improve the project and reduce impacts are critical. The Review Board carefully considered the commitments the developer made and these commitments are a part of the Review Board's considerations and conclusions. These include final scope of development components listed in Table 3, commitments from the developer's commitments table and those described in the sections that follow.

The Review Board's conclusions assume that the developer will implement its commitments and that the appropriate regulatory authorities and government agencies will ensure they are implemented as appropriate.

Note: The Review Board observes that during the course of an environmental assessment, submissions from several parties did not always provide adequate supporting evidence. Parties need to state why a specific impact was a concern and was likely to occur and provide supporting evidence when making recommendations to the Review Board on that concern.

3.1 Impacts on water quality from mine effluent

3.1.1 Summary of Review Board's conclusions on impacts to water quality

The Review Board has considered all of the evidence relating to impacts of mine effluent on water quality and viewed the various mine components and project design elements individually and in combination. In its review of impacts to water quality, the Review Board has considered Canadian Zinc Corp. project design mitigation, commitments from the developer related to water quality and presented its conclusions in the context of:

- the site specific water quality objectives Framework
- the water storage pond
- the water treatment plant
- the exfiltration trench, and
- tailings management.

These project components are viewed collectively in the Review Board's consideration of the impacts to water quality from the Prairie Creek Mine. The Review Board finds that the project as proposed by the developer with incorporation of commitments related to water quality is not likely to have significant adverse impacts on water quality.

3.1.2 Water as a key line of inquiry

The Review Board identified water quality as a key line of inquiry in the Terms of Reference based on information gathered during meetings held in Dehcho communities and from government agencies. During public hearings in Nahanni Butte and Fort Simpson Dehcho, Aboriginal leaders confirmed in their statements to the Review Board the importance of water quality.

This section of the Report examines the evidence on the potential impacts to water quality in Prairie Creek and the downstream river system from effluent discharge from the mine site to both surface water and ground water. Canadian Zinc Corp. assessed potential impacts to local and downstream water quality as the key line of inquiry in the Terms of Reference for the environmental assessment of the Prairie Creek Mine project. The *Terms of Reference* required Canadian Zinc Corp. to address potential impacts to Prairie Creek including:

- The historic impact of mine water discharged into Prairie Creek between 1980 and 2006, as well as treated effluent discharged starting in 2006
- Identification, descriptions and estimated amounts of contaminants from all potential sources at the mine site
- Prediction of the likely water quality and quantity of final effluent discharged to the environment during all phases of the mine life cycle including prediction of likelihood and consequences
- Assessment of potential impact outcomes of effluent discharge on Harrison and Prairie Creeks including likelihood of occurrence and consequences
- Identification of potential sources of contaminated groundwater not captured in the mine water management system
- Discussion of the adequacy of proposed water management and treatment facilities during mine operations
- Assessment of the likelihood and consequences of accidents, malfunctions or impacts of the environment on the development
- Description of operations-stage and long-term water quality monitoring and management. (PR#235 pp21-23)

Impacts to water quality

The Review Board considered changes to water quality resulting from the construction, operation and closure of the Prairie Creek Mine. Submissions from parties and Canadian Zinc Corp. during information requests, at technical sessions, in technical reports, at the public hearings and in final submissions focused on impacts to water quality of Prairie Creek and the downstream aquatic environment. The following is a summary of the potential impacts to water quality from the mine:

- Mine effluent may result in the release of elevated concentrations of metals and other contaminants into Prairie Creek that may harm fish and aquatic life
- Mine effluent may degrade the aquatic ecosystem and result in an unacceptable level of change to the aquatic ecosystem
- Contaminants in mine effluent may have an adverse impact the ecological integrity of Nahanni National Park Reserve
- Elevated levels of mercury from mine effluent may bio-accumulate (move up the food chain) in fish and could impact an aboriginal fishery at the mouth of Prairie Creek

During the community hearing in Nahanni Butte, Review Board members heard from Chief Fred Tesou and elders of the Nahanni Butte Dene Band on the need to protect water. Elder Elsie Marcellais told the Review Board members that "I want us to protect our watershed", that "we are thinking about the future of our young generation" and "I'm thinking about the water and the future of our children" (PR#432 Day 1 p 94-95). This view was expressed by other elders at the community hearing.

Chief Jim Antoine addressed the Review Board at the hearings in Fort Simpson. Chief Antoine stated that "There is a lot of discussion, questions about water. We had serious concern about water quality and we are still very concerned about it" (PR#432 p 149). Chief Antoine further noted that "the river that flows by Prairie Creek eventually flows by us here in Fort Simpson" and "For us here in Fort Simpson, we continue to be very concerned of the water… this is the first mine in our region and we've got to do it right" (PR#432 Day 2 p149-150).

Sam Gargan, Grand Chief of the Dehcho First Nation also addressed the Review Board during the hearings in Fort Simpson. Grand Chief Gargan stated that he represents ten communities and stressed that "whatever swims and lives in the water, we have to take care of" and that "a mine can have an impact on the quality of our water" (PR#432 Day 2 p155-161).

The following identifies sub-sections within the impacts to water quality section of this Report. These subsections consider water quality objectives, operational aspects of the project and mine components that are relevant when considering the impacts of mine effluent on water quality. This approach considers the issues separately, while recognizing that they are inter-connected.

3.1.3 Framework for deciding site specific water quality objectives that is protective of the environment

3.1.4 Sufficient water storage capacity on site to achieve water quality objectives, to store water through months of low creek flow and contingency storage for unplanned events
3.1.5 A water treatment plant process that will assist in meeting water quality objectives
3.1.6 A mine effluent outfall design into Prairie Creek and an initial dilution zone that will assist in meeting water quality objectives
3.1.7 Temporary tailings storage during operations and relationship with water storage capacity

3.1.3 Site specific water quality objectives

The section describes the term site specific water quality objectives (SSWQOs) and outlines how the term is applicable to this project. In addition, this section describes two different approaches used to derive SSWQOs, namely the toxicity-based approach and the reference condition approach.

Site Specific Water Quality Objectives

After the public hearings, Environment Canada submitted documents to the Review Board prepared by the Canadian Council Ministers of the Environment (CCME) that provide guidance and protocols in the development of site specific water quality objectives (PR#425, #426).

Water quality objectives are defined in the *Canadian Water Quality Guidelines for the Protection of Aquatic Life – Site Specific Guidance* document as "as numerical concentrations or narrative statements that establish the conditions necessary to support and protect the most sensitive designated use of water at a specified site."(PR#425 p14) The CCME guidelines describe approaches to setting these objectives site specifically, explaining the philosophical basis for doing so as follows:

> "Two distinct strategies are commonly used to establish WQOs [water quality objectives] in Canada, including the antidegradation strategy and the use protection strategy. For water bodies with aquatic resources of national or regional significance, the WQOs are established to avoid degradation of existing water quality. For other water bodies, the WQOs are established to protect the designated uses of the aquatic ecosystem. As long as the designated water uses are protected, some degradation of existing water quality may be acceptable in these water bodies, provided that all reasonable and preventative measures are taken to protect water quality conditions." (PR#425 p15)

Parties brought two different approaches to deciding SSWQO during the public hearings. The approaches were commonly referred to, respectively, as:

- the CCME Approach also called the toxicity-based approach; and

- the reference condition approach also called the background concentration procedure.

These two approaches are discussed further below.

CCME Approach (toxicity-based approach)

The CCME Protocol for the Derivation of Water Quality Guidelines for the Protection of Aquatic Life 2007 describes this approach. The derivation includes a literature review and stakeholder communication, physical and chemical behavior of substances in the aquatic environment, toxicological information, data from studies, bio-availability as well as bioaccumulation among the steps in developing national water quality guidelines (PR#426, Part 1 p5, Part 2 p1-4). This has been the most commonly used approach in the regulation of mining effluent in the Northwest Territories and Canada and is generally accepted as a highly protective approach.

Reference Condition Approach (background concentration procedure)

The CCME Site-Specific Guidance document refers to this approach as the "background concentration procedure". In this approach, "the natural background concentrations of a contaminant in water…are determined and these levels are used to define acceptable water quality conditions at the site" (PR#425 p19). The CCME document further states that "its use is based on the premise that surface water systems with superior water quality should not be degraded" and that "this approach has been use most commonly to define WQOs for relatively pristine water bodies" (PR#425 p19).

The CCME Site Specific Guidance document notes that "it is possible that the costs associated with implementing remedial measures necessary to comply with the WQOs could be substantial in certain situations". In these cases "more certainty in the WQOs may be required to assure such expenditures are justified" (PR#425 p18).

Site Specific Water Quality Objectives (SSWQOs) and Effluent Quality Criteria

SSWQOs apply to the concentration of a chemical in a receiving water body and are not normally regulatory control points. During the regulatory phase of the project, the Mackenzie Valley Land and Water Board will use SSWQOs to calculate effluent quality criteria in a water license. Effluent quality criteria are end of pipe discharge limits. When making the determination on water quality objectives, the Review Board considers the acceptability of site specific water quality objectives when making a decision on the significance of impacts. The Review Board will not provide a recommendation on effluent quality criteria because it is the responsibility of the Mackenzie Valley Land and Water Board.

3.1.3.1 Developer's submission

In its Developer's Assessment Report and throughout the course of the analytical phase of the environmental assessment, Canadian Zinc Corp. proposed SSWQOs that were established partly using a reference condition approach and partly derived using toxicity based guidance from CCME (PR#255 p270 and App #7, PR#369 Appendix D). Canadian Zinc considered this approach to be sufficiently protective of the aquatic environment downstream of the Prairie Creek Mine.

Following the public hearing, Canadian Zinc Corp. and AANDC, along with other parties, held meetings to discuss a framework for developing site-specific water quality objectives that would be more protective of water quality. This post-hearing work included the compiling data to calculate revised reference condition approach benchmarks, initiation of a program to collect additional winter water quality data, an evaluation of additional water storage options and a desk-based study on process water treatment options (PR#469 p2-3). These combined activities form the basis for Canadian Zinc Corp.'s Framework for Establishing SSWQOs.

Table 1 of Canadian Zinc Corp.'s final submission is a Summary of Prairie Creek Existing and Predicted Water Quality During Mine Operations. Canadian Zinc Corp. states that the revised objectives in the table are significantly lower than the water quality objectives proposed prior to the public hearing. Canadian Zinc Corp. states that they have collaborated with AANDC and other parties in a process to produce SSWQOs that are achievable and protective. In the opinion of the developer, the Canadian Zinc Corp. revised objectives provide a safety factor that will be sufficient to avoid significant change in the downstream ecosystem (PR#469 p4).

In their final submission on water quality objectives, Canadian Zinc Corp. states that their approach to SSWQOs is more than adequate to ensure there will be no significant adverse impacts on the aquatic environment. Canadian Zinc Corp. believes that some concentrations can exceed reference condition approach benchmarks and still not lead to significant change in the aquatic system and does not agree that reference condition approach benchmarks must be set for all water quality parameters (PR#469 p2,3).

The Framework for Establishing SSWQOs (Framework) along with a Terms of Reference for the Site Specific Ecological Risk Assessments is included in of the Canadian Zinc Corp. Final Submission. Site Specific Ecological Risk Assessments will be used on water quality parameters that do not meet reference condition approach benchmarks. Canadian Zinc Corp. notes that its version of both the Framework and well as the scope and application of the Site Specific Ecological Risk Assessments differs from the approach AANDC proposed. However, the developer states that "CNZ's compromise on this matter does not lessen our conviction that meeting the CZN Revised Objectives will avoid significant adverse impacts" (PR#469 p5).

3.1.3.2 Parties' submissions

As noted previously, water quality is the key line of inquiry for the Prairie Creek mine environmental assessment. In their technical reports and final submissions, some parties expressed concern with the position on water quality objectives taken by Canadian Zinc Corp. and expressed their support for the AANDC approach. The following focuses on AANDC's submissions to the Review Board on site specific water quality objectives, while noting the support for the AANDC's position from other parties including Parks Canada and Dehcho First Nations.

During the hearings in Fort Simpson, AANDC described the reference condition approach as being based on measurements of water quality in the field at locations upstream and downstream of the proposed mine to decide natural background values. Averaging the data collected plus some acknowledgement of natural variability of Prairie Creek provides the benchmark for the reference condition. The water quality objective number in this approach therefore represents the range of natural variability (PR#432 Day 3 p286-89).

In its technical report and during the public hearings AANDC did not agree with the approach to establishing site specific water quality objectives as proposed by Canadian Zinc Corp. AANDC recommended in its technical report that site specific water quality objectives should be developed using a reference condition approach consistently across all analytes of concern (PR#389 p6-7). AANDC provided detailed rationale for this position in its technical report (p 6-8) as well as during the public hearing as follows:

> "One of the big reasons is that if we use the reference condition approach and we keep the water quality within Prairie Creek the way it is now we can be pretty sure that there's not going to be large changes in the ecosystem" (PR#432 transcripts p 294).

In its final submission, AANDC further stated that the derivation of site specific water quality objectives for receiving water needs to consider both environmental and social factors including:

- Natural background concentrations
- Toxicity of analytes (also called water quality parameters) being released
- Buffering and dilution capacity
- Chemical characteristics that modify toxicity (such as hardness and pH)
- Biological characteristics (biological diversity or species at risk)
- Existing human use of the water (drinking or fishing)

(PR#466 p6)

In its final submission, AANDC continued to maintain that deriving SSWQOs from the reference condition approach, or not exceeding an upper limit of natural variability, will

provide the most appropriate level of protection to Prairie Creek (PR#466 p7). In its view using the reference condition as a starting point for deriving site specific water quality objectives provides a high degree of confidence for mitigation of adverse impacts to water quality. Deriving SSWQO from a different method, such as ecological risk assessments as proposed by Canadian Zinc Corp., provides for a lower degree of confidence that significant adverse impacts to Prairie Creek from mine effluent can be mitigated. (PR#466 p9)

AANDC has updated its position on the development of acceptable site specific water quality objectives after post-hearing meetings with the developer. A Proposed Process for Deriving Site Specific Water Quality Objectives for the Prairie Creek Mine is presented in Appendix C of the AANDC final submission along with an Ecological Risk Assessment Terms of Reference in Appendix D (PR#466). The versions of the Site Specific Water Quality Objectives Framework and accompanying Site Specific Ecological Risk Assessments submitted by AANDC are similar but not the same as that submitted by Canadian Zinc Corp.

The key difference in the AANDC position is the step within the Site Specific Water Quality Objectives Framework at which an ecological risk assessment for parameters that could not achieve the reference condition approach would occur. AANDC's position is that the ecological risk assessment step should take place after considering the feasible implementation of additional water storage or enhanced treatment options (PR#466 p12). In contrast, the Canadian Zinc Corp. Framework places the Site Specific Ecological Risk Assessments step before the evaluation of increased water storage capacity options or enhanced water treatment (PR#469).

AANDC states that achieving reference condition approach based site specific water quality objectives by enhancing water treatment and providing increased storage provides higher confidence that impacts to Prairie Creek can be mitigated (PR#466 App B p5). ANNDC also recommends that if the developer's Desk Top Study of Water Treatment Options can be readily achieved, then that treatment option must be implemented during operations (PR#466 p13). In its final submission, ANNDC recommends that the Review Board include the site specific water quality objectives process as described in Appendix C of the submission and the ecological risk assessment as described in Appendix D of the submission as measures in the Report of Environmental Assessment.

Parties expressed particular concern with mercury in the development of SSWQOs. Parties state that impacts to water quality from the release of mercury during operations and post-closure could occur (PR#389, PR#390, #388). Increases in mercury concentrations because of mining activities could increase bio-accumulation of mercury in the food chain in the creek. In its technical report, AANDC specifically "recommends that CZN collect and analyze additional samples (seasonally representative) using a sufficiently low detection limit to permit development of a site specific water quality objective for mercury in Prairie Creek using the Reference Condition Approach". AANDC further recommends that Canadian Zinc Corp. "quantify the level of impact in Prairie Creek resulting from increased concentrations of mercury" (PR#389 p 19).

With respect to mercury concerns, Canadian Zinc Corp.'s response in its Comments on Government Agency Technical Reports is that the sampling requested by AANDC for mercury has been initiated. In response to impact predictions the developer responds as follows: "CZN has demonstrated that an objective can be met which will avoid significant impacts. CZN has also demonstrated that bio-accumulation and bio-availability of mercury is highly unlikely." (PR#470, Attachment 1 p2)

3.1.3.3 Review Board's analysis and conclusions

The Review Board has considered the approach to deriving SSWQOs presented by Canadian Zinc Corp. and AANDC. The Canadian Zinc Corp. proposal as described in its final submission presents a hybrid approach between the two methods for arriving at SSWQOs. The Review Board acknowledges the position of Canadian Zinc Corp. that mineralization at the existing mine naturally discharges mineralized water into Prairie Creek and that consideration of ecosystem change must take this into account.

The Review Board believes that with the implementation of either the Canadian Zinc Corp. approach or the AANDC approach to deriving site specific water quality objectives, significant adverse impacts to water quality are not likely. Canadian Zinc Corp. has made a commitment for additional monitoring due to concerns raised by communities in the Dehcho Region. The Review Board supports this initiative and believes it should be pursued.

The Review Board is of the view that the implementation of either approach to site specific water quality objectives is not likely to significantly impact water quality in Prairie Creek in the area of the mine site, in Prairie Creek at the Nahanni National Park Reserve boundary or in Prairie Creek at its confluence with the South Nahanni River. The Review Board recognizes that the Mackenzie Valley Land and Water Board will decide the limits to protect water quality that are appropriate for this project and setting.

3.1.4 Water storage and management

3.1.4.1 Developer's and parties' submissions

The ability to store water on site is a key component of the Prairie Creek mine plan. Adequate operating water storage volumes in the existing pond are required to accommodate variations in mine flows from underground, variations in the flow of Prairie Creek, treatment plant or outfall upsets, or any combination of these operational constraints. Tailings will also be temporarily stored in the existing water storage pond during mine operations.

In its technical report and during the public hearings, AANDC raised concerns on Canadian Zinc Corp.'s ability to maintain the overall water balance for the mine site in the event of operational upsets (PR#389, p11-13, PR#432 Day 3 p318-322). If more water needs to be

stored than anticipated, there may not be enough space in the ponds to hold water during the winter low discharge period when there are low flow conditions in Prairie Creek. AANDC further recommends that the one metre freeboard in the water storage pond should be reserved for short term emergency situations and not used for operational upsets which the developer could plan for as contingencies.

After the public hearings, Canadian Zinc Corp. advised the Review Board that options for additional water storage at the mine site were being evaluated as one way to improve site specific water quality objectives (PR#447). The options for additional water storage capacity included increasing live storage in the existing pond or constructing a second pond (PR#447). In its submission of August 21, 2011, Canadian Zinc Corp. indicated that they would adopt one of two additional water storage options and would make a commitment that one of the options would be selected (PR#450 p 1,4). This commitment was confirmed in the Final Commitments Table in the developer's September 16 document entitled *Comments on Final Arguments*. The commitment states that "Additional active water storage will be provided either by modifications to the existing WSP [water storage pond] or by building a second WSP" (PR#470 Table 1, p23).

In its final submission, AANDC notes that adequate water storage capacity is a key component of the mine's ability to meet site specific water quality objectives. The AANDC recommendation in its final arguments regarding additional water storage capacity is:

> "Final selection of an additional water storage option must be done in conjunction with the determination of Site Specific Water Quality Objectives for Prairie Creek. If increased capacity associated with construction of an additional pond provides for the ability to meet Reference Condition Approach benchmarks as defined within the derivation process, that option must be selected and implemented." (PR#466 p6)

The commitment to create additional water storage is directly related to initiatives between Canadian Zinc Corp. and parties to address site specific water quality objectives. In its final submission, the Canadian Zinc Corp. position is that "the additional water storage option that results in the lower predicted receiving water concentrations will be preferred, provided the option is clearly superior to the alternative option in terms of predicted concentrations and reduced risk" (PR470 p1). Canadian Zinc Corp. further notes that they are not opposed to adopting the water storage option that can achieve improved site specific water quality objectives, provided the results are significantly better. (PR#470 p1)

3.1.4.2 Review Board analysis and conclusions

The Review Board is of the view that the construction and use either of the additional water storage options proposed by Canadian Zinc Corp. will assist in achieving improved site specific water quality objectives and in reducing adverse impacts to water quality in

Prairie Creek. Commitments made by Canadian Zinc Corp. regarding additional water storage in the Final Commitments Table are important in the Review Board's findings. The Review Board has confidence that the Mackenzie Valley Land and Water Board will regulate these matters as appropriate for this project and setting. The Review Board finds that the Canadian Zinc Corp. commitment to increase water storage at the mine site through the construction and use of either of the additional water storage option will result in a project design that is not likely to have significant adverse impacts to water quality.

Suggestion #1

The Review Board believes that either option proposed by Canadian Zinc Corp. to increase water storage on site will improve water quality in Prairie Creek. The Review Board notes that construction of a second pond may address a broader range of risks and result in better water management on site and improved water quality in Prairie Creek. The Review Board suggests that the Mackenzie Valley Land and Water Board consider this during the licensing phase.

3.1.5 Water treatment plant

3.1.5.1 Developer's and parties' submissions

The developer proposes a new water treatment plant for the Prairie Creek Mine. The plant will be sized to treat 134 litres per second and can be expanded to double the capacity (PR#255 p277). The plant consists of two separate circuits, one for underground mine water and a separate circuit for the treatment of mill or process water. Mine water will be treated with lime while mill or process water will be treated with sulphuric acid and sodium sulphide. (PR#255 p215, Appendices 2&6).

In parties' technical reports, during the public hearings and in post-hearing meetings, parties stressed that improving the water treatment plant should be an important component in the development of site specific water quality objectives. On September 2, 2011 Canadian Zinc Corp. submitted a Desk Study of Process Water Treatment Options, which the developer's consultant SNC Lavalin prepared (PR#459). The report concluded that improvements to the water treatment plant could be achieved by either:

- enhancing the proposed sulphide-lime precipitation system by adding filtration; or
- pre-treatment with lime or sulphide followed by filtration and ion exchange.

The developer states that "Assuming improved treated water quality results, Canadian Zinc Corp. will adopt one of the two approaches." (PR#469 p3). This commitment is further stated in the Final Commitments Table as follows: "The treatment of process water will be

improved by either enhancing the currently proposed system, or adopting a precipitation-ion exchange system" (PR#470 Table 1 p23).

Nahanni Butte Dene Band's final submission states that the community wants the developer to enhance water treatment plant as a first priority. The submission further states that improving the water treatment plant should be required for the mine to achieve better water quality objectives (PR#461 p2). Dehcho First Nation likewise view improved water treatment as the first option that should be explored in order to achieve better water quality objectives (PR#463).

In its closing argument document, the AANDC recommendation regarding the relationship between water treatment and SSWQOs is as follows:

> "AANDC recommends that if, following pilot testing per the recommendations in the Developer's Desk Study of Water Treatment Options, it is identified that the Reference Condition Approach based site specific water quality objectives can be readily achieved, then that treatment option(s) must be implemented during operations" (PR#466 p13).

In its comments on final arguments, Canadian Zinc Corp. states that they want to retain flexibility in the choice of either of the two water treatment improvement options so that a balanced decision can be made regarding costs, risks and environmental protection (PR#470 p2).

3.1.5.2 Review Board's analysis and conclusions

The Review Board has considered the views expressed by parties and the developer on improvements to the water treatment plant. The Review Board notes that Canadian Zinc Corp. has committed to enhance the water treatment plant but that the exact specifics of the improvements have not yet been determined.

The Review Board finds that the choice of water treatment methods should be considered further during the water licensing phase in a manner appropriate for the proposed project and setting. The Review Board notes that the Canadian Zinc Corp. commitments for improved process water treatment will have a beneficial impact on water quality in Prairie Creek. The Review Board finds that either of the enhanced water treatment plant options proposed will improve mine effluent quality.

3.1.6 Exfiltration trench and initial dilution zone

3.1.6.1 Developer's and parties' submissions

During the analytical phase of the environmental assessment, Canadian Zinc Corp. proposed an exfiltration trench as a mine outfall strategy to improve mine effluent mixing

in the dilution zone of Prairie Creek. The developer will install the exfiltration trench across the creek and below the stream bed. The exfiltration trench and outfall design was originally described in Canadian Zinc Corp.'s March 2011 response document to the second round of information requests (PR#343 Appendices E and L).

At the technical meeting on April 12, 2011 Canadian Zinc Corp. updated parties on the specifics of the design, construction and operation of the exfiltration trench. On May 6, 2011, Canadian Zinc Corp. submitted a Progress Report on Commitments to provide information from that technical meeting. The developer submitted a modified version of Appendix B of that document on May 11, 2011. The revised version contains a report from Northwest Hydraulics Consultants regarding the mixing analysis for exfiltration trench outfall to Prairie Creek (PR#376). This document describes the location and design of the proposed double-piped exfiltration trench as well as a mixing analysis to quantify mixing and dilution capacity in the creek.

AANDC states in its technical report of June 3rd 2011, that successful operation of the exfiltration trench is critical to meeting water quality objectives in Prairie Creek (PR#389 p24). In AANDC's view, the exfiltration trench will provide the best option to enhance mixing but that the use of this type of outfall in a mining application has not been proven. Due to the risk of complications with the exfiltration pipe, including plugging, pipe breakage and uneven cross-current discharge, AANDC provided several recommendations in its final submission to address these concerns.

3.1.6.2 Review Board's analysis and conclusions

The Review Board finds that the exfiltration trench proposed by Canadian Zinc Corp. for effluent outfall into Prairie Creek is an improvement to the project design. The Review Board is of the view that the final design of the trench as described in the Northwest Hydraulic Consultants letter of December 22, 2010, will adequately address the possible complications described by AANDC (PR#343 Appendix E). The Review Board considers these final design elements described in the Northwest Hydraulics Consultants document to be part of the project and are commitments made by Canadian Zinc Corp. The Review Board agrees that the trench as proposed by Canadian Zinc Corp. with its associated commitments will assist in mine effluent mixing within the dilution zone and help meet site specific water quality objectives. The Review Board finds that construction of the exfiltration trench as part of project design will result in a project that is not likely to have significant adverse impacts to water quality.

3.1.7 Tailings management and storage

3.1.7.1 Developer's and parties' submissions

The development plan for the Prairie Creek Mine as proposed by Canadian Zinc Corp. is to have no tailings anywhere on surface after mine closure. Canadian Zinc Corp. has proposed

to place all floatation tailings underground as paste backfill in the underground voids that that are opened when ore and waste rock is removed to surface. The developer commits that no tailings will remain on surface at the end of operations (PR#470 p24). The storage of tailing on surface at the end of mine life is not part of the scope of this development and the Review Board has not assessed options for any type of surface tailings storage beyond the end of mine operations as part of this environmental assessment.

Throughout the course of the environmental assessment, parties have questioned the feasibility of placing 100% of the tailings underground including during the public hearings, post-hearing meetings and related correspondence in parties' final submissions. Disagreements between Canadian Zinc Corp. and parties include calculations of available void space underground, scheduling of void space availability, the risk of build-up of temporary tailings storage on surface and ratios of tailings to dense media separation rock in the paste mixture.

Canadian Zinc Corp. submitted a Paste Backfill Review on September 2, 2011 that provided a summary of post-hearing discussions between the developer and AANDC as well as its respective consultants. The document proposed reducing the dense media separation portion of the paste backfill in order to ensure sufficient void space with appropriate contingencies, for the placement of all floatation tailings as paste backfill underground. (PR#457)

AANDC and its consultant have expressed concern over the temporary surface storage of tailings throughout the analytical phase of this environmental assessment. In particular, AANDC is concerned with the quantity of tailings to be stored in the water storage pond during operations. The reason for the concern is that the storage of tailings reduces the volume of water that the water storage pond can store. This reduces the ability of the pond to meet water quality objectives and reduces the length of time that the pond can store mine effluent without discharging into Prairie Creek.

In order to address this concern, AANDC has requested that the following two recommendations from the tailings disposal portion of its closing argument submission be included as measures in the Report of Environmental Assessment as follows:

> "The volume of floatation tailings stored in the water storage pond during operations not to exceed 50,000 m^3 and no other surface storage of floatation tailings permitted during operations", and "No paste tailings to be stored on surface other than those contained within the paste plant itself" (PR#466 p18).

During the early stages of mine development, Canadian Zinc Corp. has stated that 50,000 m^3 of floatation tailings would be stored in the water storage pond below the 877 metre water level at mine start-up while underground mine openings are being created. In Canadian Zinc Corp.'s view, temporary tailings storage in the pond would therefore not interfere with water storage range or "live storage" above that elevation because the re-

engineered design of the existing water storage pond requires a minimum pond elevation of 877 m. This minimum elevation of 877 metre in the water storage pond is a Canadian Zinc Corp. commitment (PR#470, Table 1 p20). As described in the water storage pond section, Canadian Zinc Corp. has also committed to increasing total water storage capacity either by increasing the height of the dykes in the existing pond or by constructing a second pond.

There was discussion between parties and the developer over the amount of tailings to be placed in the water storage pond, which should be considered by the Mackenzie Valley Land and Water Board.

Canadian Zinc Corp. explains that they have omitted the AANDC phrase in the recommendation "no other surface storage of floatation tailings permitted during operations" because they believe that this commitment is rendered unnecessary by recommendation 4 above, and that they have no objection to recommendation 4. (PR#470 p5)

The Review Board notes that there may be possible misinterpretation in the above positions between parties and the developer with the use of the terms "floatation tailings" and "paste tailings". This is worth clarifying because temporary tailings storage and site water capacity are critical components of this project and are key in considering impacts on water quality. The Review Board clarifies the issues as follows.

It is the Review Board's view that Canadian Zinc Corp. states it has no objection to recommendation 4 on the understanding that it means that "no other surface storage of floatation tailings permitted during operations". (PR#470 p5)

The Review Board considers this statement to mean that Canadian Zinc Corp. has committed that no floatation tailings or paste tailings will be stored on surface other than in the water storage pond or in the paste backfill plant. The Review Board has based its consideration of the development's impacts on water quality on this understanding and also made its significance decision based on that understanding.

In its September 2, 2011 Paste Backfill Review, Canadian Zinc Corp. acknowledges that a greater amount of dense media separation rock reporting to the waste rock pile may alter the quality of leachate (or contaminated runoff) generated from the pile as compared to initial predictions. The Canadian Zinc Corp. September 2, 2011 submission includes an accompanying sensitivity analysis conducted by pHase Geochemistry on the effects of storing a greater proportion of dense media separation rock within the waste rock pile (PR#457).

As a result of a possible increase in leachate from increased dense media separation rock in the waste rock pile, the developer has committed to segregate the dense media separation

rock in the waste rock pile. This will allow for greater control of the dense media separation material if required during mine closure activities (PR#470 p 23). In addition, Canadian Zinc Corp. has committed to collecting seepage from the waste rock pile in a lined pond at the toe of the waste rock pile and transferring it to the water storage pond for either recycling or treatment before discharge into the environment (PR#470 Table 1 p21).

AANDC notes in its final submission that there is a risk of subsurface drainage from the waste rock pile and that some subsurface flow may bypass the seepage collection pond and pass through sub-surface gravels directly into Harrison Creek. To mitigate these impacts, AANDC recommends the "installation of a seepage collection system for the Harrison Creek aquifer should be included in the development plan" (#466 p17-18). In its Comments of Final Arguments, Canadian Zinc Corp. acknowledges the risk of leachate evading the seepage collection pond at the toe of the waste rock pile. As a precautionary approach, Canadian Zinc Corp. commits to install a shallow groundwater interceptor system at the toe of the waste rock pile to collect drainage as recommended by AANDC (PR#470 p5-6).

3.1.7.2 Review Board's analysis and conclusions

The Review Board finds that Canadian Zinc Corp. has considered the issue of tailings management during operations and at closure in a thorough manner. Canadian Zinc Corp. has retained consultants with international expertise with many years of operational experience in underground tailings paste backfill technology. Canadian Zinc Corp. has improved their project design and answered the questions from parties and its consultants regarding the feasibility of placing all tailings back underground. Canadian Zinc Corp. has also made important commitments with respect to temporary surface storage of tailings in addition to the ultimate placement of all tailings underground. An important factor in the Review Board's conclusions about this issue is the fact that surface storage of tailings will not extend beyond the 14 years of operations for which this project is proposed. The Review Board recognizes the important role of the Mackenzie Valley Land and Water Board in regulating this issue in a manner appropriate for this project and setting.

Due to the location of the mine site on the floodplain of Prairie Creek in a space-constrained valley, the Review Board regards tailings management during operations and at closure as critical to maintaining acceptable water quality in Prairie Creek. The Review Board recognizes that there are uncertainties in predicting the long-term effectiveness of the developer's proposal to place all tailings paste backfill underground.

The Review Board agrees that placing all tailings underground as tailings paste backfill rather than placing all or portions of the tailings on surface would greatly reduce the risk of contaminants being released from the tailings into water. The Review Board finds that the tailings paste backfill and overall tailings management proposed by Canadian Zinc Corp. with the associated commitments will result in a project design that is not likely to have significant adverse impacts on water quality.

Suggestion #2

The Review Board suggests that Canadian Zinc Corp. prepare a Tailings Management Plan for both the permanent storage of tailings underground and the temporary storage of tailings on surface at the mine site. The Review Board suggests that this Plan should be part of the water license.

3.1.8 Board conclusions on impacts to water quality

The Review Board has considered all of the evidence relating to impacts of mine effluent on water quality and viewed the various mine components and project design elements individually and in combination. In its review of impacts to water quality, the Board has considered CZN project design mitigation, commitments from the developer and presented the Board's conclusions in the context of:

- the site specific water quality objectives Framework
- the water storage pond
- the water treatment plant
- the exfiltration trench, and
- tailings management.

These project components are viewed collectively in the Board's consideration of the impacts to water quality from the Prairie Creek Mine. The Board finds that the project as proposed by the developer with incorporation of commitments is not likely to have significant adverse impacts on water quality.

3.2 Impacts to fish and aquatic life

3.2.1 Exfiltration trench

3.2.1.1 Developer and parties' submissions

The construction, operation and decommissioning of the exfiltration trench in Prairie Creek has the potential to impact fish and fish habitat. The Department of Fisheries and Oceans final submission states that activities associated with the exfiltration trench will result in the harmful alteration, disruption and destruction of fish habitat and will require an authorization under ss.35(2) of the *Fisheries Act*. (PR#465 p2).

Canadian Zinc Corp. has committed to providing Department of Fisheries and Oceans with the following prior to the construction of the exfiltration trench:

- a detailed fish habitat assessment at the location of the exfiltration trench

- detailed design plans and mitigation measures
- a compensation plan to offset any impacts to fish and fish habitat
- consult with Department of Fisheries and Oceans on the approach to decommissioning of the exfiltration trench.

(PR#470 Table 1 p12)

Should the harmful alteration, disruption and destruction of fish habitat resulting from the exfiltration trench be authorized, Department of Fisheries and Oceans will have monitoring requirements during construction of the trench and will require criteria for habitat compensation works (PR#465 p2).

Department of Fisheries and Oceans is concerned that the exfiltration trench may interfere with movement of bull trout, mountain whitefish and arctic grayling in Prairie Creek. In its technical report, Department of Fisheries and Oceans states that bull trout are considered a species that "may be at risk" by the Government of the Northwest Territories and are known to be sensitive to disturbance. In addition, information Canadian Zinc Corp. provided during the environmental assessment indicates that Prairie Creek is an important migratory route for bull trout to spawn in Funeral Creek, upstream of the mine. Ongoing research by Department of Fisheries and Oceans has confirmed that there is movement of bull trout between Prairie Creek and Funeral Creek and that overwintering may occur. (PR#392 p6)

Department of Fisheries and Oceans states that any *Fisheries Act* authorization associated with the exfiltration trench will require monitoring and if necessary, require that corrective actions be taken to ensure that fish movements are not impacted (PR#465 p2).

In its September 16, 2011 Comments on Final Arguments, Canadian Zinc Corp. states that the exfiltration trench design includes the objective and provision for year-round fish passage. In addition, Canadian Zinc Corp. commits to temperature, flow and total suspended solids monitoring when discharge in the trench is occurring as recommended by Department of Fisheries and Oceans in its technical report. (PR#470 Attachment 1, p11 and PR#392 p7)

In its Final Commitments Table, the developer states that a detailed habitat assessment at the location of the exfiltration trench will be conducted. In addition, measures will be developed to the satisfaction of the Department of Fisheries and Oceans to protect the creek during detailed design prior to construction of the exfiltration trench. (PR#470 p12).

3.2.1.2 Review Board's analysis and conclusions

The Review Board is confident that impacts to fish and fish habitat from construction, operation and decommissioning of the exfiltration trench can be mitigated through commitments made by Canadian Zinc Corp. and regulatory mechanisms in the *Fisheries Act* administered by Department of Fisheries and Oceans.

The Review Board therefore finds that there will not likely be significant adverse impacts to fish and fish habitat from activities associated with the construction, operation or decommissioning of the proposed exfiltration trench. The Review Board believes that Fisheries and Oceans Canada can address fisheries concerns through regulatory authorizations.

3.2.2 Water withdrawal

3.2.2.1 Developer and parties' submissions

During annual construction and operation of the winter road, Canadian Zinc Corp. will require water to construct road beds and snow and ice fills at stream crossings. In its response to information requests on March 2011 from both the Department of Fisheries and Oceans and Parks Canada, Canadian Zinc Corp. identified four locations for water withdrawal that the developer would rely on for water withdrawal. The locations are: well water from the mine site, Mosquito Lake at kilometre 61, Gap Lake at kilometre 121 and the Liard River (PR#343 p11). In Appendix B of the March 2011 Information Request 2 response document, a consultant for Canadian Zinc Corp. provided preliminary estimates of water consumption for road construction and operation, noting that estimates are highly variable.

In its technical report, Department of Fisheries and Oceans identified outstanding concerns with water withdrawal due to potential adverse impacts on fish and fish habitat. To mitigate potential impacts to fish from water withdrawal Department of Fisheries and Oceans recommends that Canadian Zinc Corp. follow Department of Fisheries and Oceans' "Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the NWT" and "DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines". In addition, Department of Fisheries and Oceans recommends that Canadian Zinc Corp. conduct a bathymetry survey on lakes proposed for withdrawal prior to the regulatory phase.

In its *Comments on Final Arguments*, Canadian Zinc Corp. commits to following the Department of Fisheries and Oceans protocols for water withdrawal (PR#470 Attachment 1 p11 and Table 1 p 11). After Department of Fisheries and Oceans had advised Canadian Zinc Corp. that the water withdrawal policy applies only to lakes, Canadian Zinc Corp. committed to consulting with Department of Fisheries and Oceans prior to extraction of water from creeks to ensure the project avoids impacts to fish and fish habitat. (PR#363 p3) Canadian Zinc Corp. commits to providing bathymetry for lakes it is proposing to use for water withdrawal, but does not agree that the bathymetric survey need occur prior to the regulatory phase as recommended by Department of Fisheries and Oceans. Canadian Zinc Corp. states that the timing of bathymetry data collection should be flexible (PR#470 Attachment 1, p11).

3.2.2.2 Review Board's analysis and conclusions

The Review Board is confident that impacts to fish and fish habitat from water withdrawal during winter road construction and operation can be mitigated through commitments made by Canadian Zinc Corp. as well as the guidelines, protocols and regulatory mechanisms administered by Department of Fisheries and Oceans. The Review Board finds that water withdrawal during construction and operation of the winter access road is not likely to have significant adverse impacts to fish and fish habitat.

3.2.3 Aboriginal fishery at Prairie Creek mouth

3.2.3.1 Developer and parties' submissions

The Addendum to the Traditional Knowledge Study submitted by the Nahanni Butte Dene Band includes information on fish and traditional fish harvesting in Prairie Creek. The study identifies the mouth of Prairie Creek as a high land use area by members of the Nahanni Butte Dene Band. Fish harvesting occurs in this area and concerns were expressed by community members that pollutants or a sudden spill at the mine site would negatively impact fish using the lower portion of Prairie Creek. (PR#245 p3)

In its Technical Report, AANDC lists aspects that should be considered in setting water quality objectives, including the traditional/subsistence arctic grayling fishery at the mouth of Prairie Creek (PR#389 p8, 19). During the public hearing in Nahanni Butte, a young community member requested clarification from AANDC on where this aboriginal subsistence fishery information came from. AANDC's response was that information on the traditional subsistence fishery at the mouth of Prairie Creek was from the Traditional Knowledge Study prepared for the Nahanni Butte Dene Band (PR#432 Day 1 p136-37).

Canadian Zinc Corp. has committed to project design components that will improve the quality of effluent discharge from the mine, including and enhanced treatment plant, an increase in water storage capacity and an improved outfall design. Improvements to mine effluent quality will reduce impacts to fish. In addition, a Spill Contingency Plan will be prepared for the mine site to respond to spills (PR#470 p16, 19).

3.2.3.2 Review Board's analysis and conclusions

The Review Board acknowledges that aboriginal fish harvesting took place traditionally at the mouth of Prairie Creek, and that fish harvesting by Nahanni Butte Dene Band members continues at that location in the present day. The Review Board finds the development is not likely to have significant adverse impacts on the aboriginal fishery at the mouth of Prairie Creek provided the developer implements its commitments to improve mine effluent quality and address any spills at the mine site.

3.3 Impacts on ecological integrity of Nahanni National Park Reserve

Nahanni National Park Reserve was originally established in 1976, consisting of an area of more than 4,700 km^2. In 2009 the Nahanni National Park Reserve was expanded to approximately 30,000 km^2 (Figure 4: Nahanni National Park Reserve). As a result of park expansion, the Prairie Creek mine is now surrounded by the Nahanni National Park Reserve, but is not on national park lands. A 77 kilometre portion of the winter access road is within expanded park boundary and is on national park lands. The *Canada National Parks Act* specifically allows for this mining access road through the Nahanni National Park Reserve to the Prairie Creek Mine. (PR#390 p1-2)

The area within the original 1976 boundary of the Nahanni National Park Reserve is a World Heritage Site under the United Nations Educational, Scientific and Cultural Organization and the portion of the South Nahanni River within the park is designated as a Canadian Heritage River. These designations are in recognition of the superlative natural phenomena, features and formations of the Nahanni National Park Reserve, its natural beauty and wilderness recreation opportunities. (PR#390 p2)

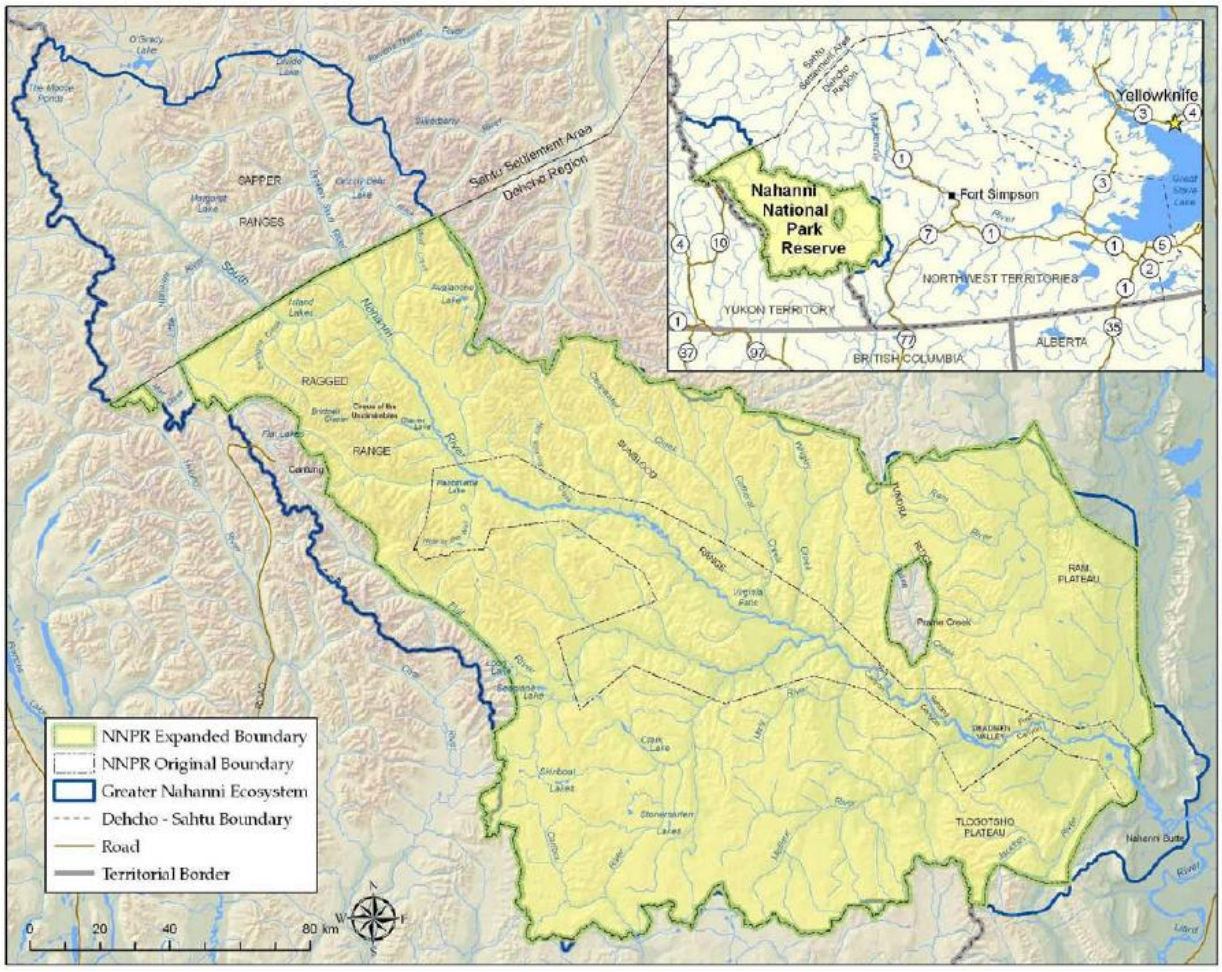


Figure 4: Nahanni National Park Reserve
Source: Map of Nahanni National Park Reserve of Canada, Parks Canada Technical Report PR#390

In July 2008, Parks Canada and Canadian Zinc Corp. signed a Memorandum of Understanding that acknowledged the interests of both parties with the goal of managing both the park expansion and mine development and access through the park. (PR#390 p 1) Consideration of impacts of the project on the ecological integrity of Nahanni National Park Reserve was identified in the Terms of Reference for this environmental assessment and Canadian Zinc Corp. assessed these impacts in its Developer's Assessment Report. This section discusses impacts of the project on ecological integrity of Nahanni National Park Reserve with a focus on:

- Ecological integrity and the aquatic ecosystem
- Aquatic Effects Monitoring Program

3.3.1 Developer and parties' submissions

Ecological integrity and the aquatic ecosystem

While the Prairie Creek mine is not within the Nahanni National Park Reserve, water from the mine site will flow into the Park, approximately seven kilometres downstream and will remain within Park boundaries for the following 115 kilometres. In its submissions throughout this environmental assessment, Parks Canada has repeatedly expressed its goal to protect the ecological integrity of Nahanni National Park Reserve. In its technical report as well as in earlier submissions, Parks Canada provides the definition of ecological integrity from the *Canada National Parks Act* as follows:

> "ecological integrity means, with respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes" (PR#390 Appendix 2).

In applying this definition to the Prairie Creek watershed, Parks Canada suggests a list of outcomes that would be expected to occur if ecological integrity were to be maintained in the aquatic ecosystem (PR#390 Appendix 2). In its final submission, Parks Canada's states that ecological integrity of the Prairie Creek ecosystem would be maintained if physical process that influence aquatic ecosystems remain within the natural range of variation in the Nahanni National Park Reserve (PR#464 p10).

During the public hearings, Canadian Zinc Corp. questioned Parks Canada on how ecological integrity could be placed in the context of water flowing into a park and defining the natural range of variability (PR#432 p154-56).

Recommendations from Parks Canada in its Final Submission to achieve the goal of maintaining ecological integrity include basing site specific water quality objectives on the reference condition approach to the degree possible, additional water storage capacity and additional water treatment in an effort to achieve the reference condition approach to determining SSWQOs (PR#464 p10-11). In Parks Canada's view, the long-term legacy of the Prairie Creek Mine during post-closure will be important in maintaining ecological integrity of the Nahanni National Park Reserve. In order to reduce impacts from metal loading on water quality in the post-closure phase Parks Canada provides recommendations summarized as follows:

- No paste tailings to be stored on surface other than in the paste plant
- No paste tailings to be stored within the waste rock pile
- DMS rock be segregated within the waste rock pile
- Seepage collection system below the waste rock pile (PR#464 p11-12)

Canadian Zinc Corp. provides responses to the Parks Canada recommendations identified above in its Comments on Final Arguments document. These impacts and proposed mitigation commitments are also discussed in the impacts to water quality section (3.1) above. The developer commits that no paste tailings will be stored on surface other than those contained within the paste plant itself and that floatation tailings will not be stored on surface except for in the water storage pond (PR#470 p14). Canadian Zinc Corp. has committed that paste tailings will not be stored in the waste rock pile and that DMS rock will be segregated within the waste rock pile. (PR#470 p14-15) Canadian Zinc Corp. has also committed to a construct a shallow groundwater interceptor trench to capture seepage from the waste rock pile (PR#470 p5-6).

Aquatic Effects Management Plan - Adaptive Management Plan

With respect to Aquatic Effects Management Plans, Canadian Zinc Corp. states in its Comments on Final Argument document that "we agree, although we believe that the work can be completed during the water licensing phase, and Canadian Zinc Corp. would not object to an approved Aquatic Effects Management Plan being a condition of the Water Licence" (PR#470 Attachment 1 p4). Canadian Zinc Corp. also agrees with the Parks Canada recommendation of locating aquatic effects monitoring sites within the Nahanni National Park Reserve. Canadian Zinc Corp. further states in its Comments on Final Arguments document that "Canadian Zinc Corp. will work with Parks Canada and the Aquatic Effects Monitoring Program technical advisory group to establish monitoring sites" (PR#470 Attachment 1 p17).

3.3.2 Review Board's analysis and conclusions

The Review Board held above that implementation of either of the two approaches proposed to deciding water quality objectives is not likely to have significant adverse impacts on the environment. This finding is important to the Review Board's opinion on impacts to the ecological integrity of Nahanni National Park. In addition, the developer has committed to constructing additional water storage capacity on site and has made commitments to enhance the water treatment process. The Review Board notes that the developer has committed to prepare an Aquatic Effect Monitoring Program and Adaptive Management Plan during water licensing.

The Review Board acknowledges and supports the collaborative approach proposed by Canadian Zinc Corp. for monitoring of the aquatic ecosystem within the Park.

In its consideration of ecological integrity, the Review Board notes the commitments made by the developer as well as the Review Board's findings in the above sections of this document. The Review Board finds that the development is not likely to have significant adverse impacts on the environment and is not likely to have significant adverse impacts on the ecological integrity of Nahanni National Park Reserve.

3.4 Impacts to land and water from winter road construction and operation

The approximately 180 kilometre winter access road from the Prairie Creek mine to Highway 3 at Lindberg Landing was constructed in 1980 and operated for two winter seasons to haul supplies for the partially constructed mine site. The winter access road has not been used since that time and is overgrown and not accessible to vehicles.

The road will be constructed and operated from approximately November 1 to March 31 each winter season under frozen ground conditions. There are two transfer facilities proposed near the Liard River and Tetcela River. Canadian Zinc Corp. has proposed several access route re-alignments resulting from consultation with Nahanni Butte Dene Band and Parks Canada, to address safety and environmental concerns. (PR#255 p222)

Field reconnaissance of the proposed access road re-alignments conducted in August 2010 resulted in the following proposed re-alignments to the existing route: (PR#343 Appendix E p1, Figure 4.1)

- Kilometres 48-56.5 Polje re-alignment (within Nahanni National Park Reserve)
- Kilometres 94-99 Silent Hills (within Nahanni National Park Reserve)
- Kilometres 99-118 Wolverine Pass to Grainger Gap
- Kilometres 125-170 Nahanni Front Range alternative

Stream crossings that require bridge structures include (PR#397 p4)

- Kilometres 6.0 Casket Creek (existing bridge)
- Kilometres 13.1 Funeral Creek
- Kilometres 23.0 Drum Creek, tributary of Sundog Creek (within Nahanni National Park Reserve)
- Kilometres 52.9 Polje Creek (within Nahanni National Park Reserve)

The winter access road also crosses a number of smaller watercourses along its length. Seasonal construction across these streams will include snow-fill and temporary span structures.

3.4.1 Permafrost degradation and sediment inputs

Specific impacts identified by parties from construction and operation of the winter access road include the following:

- Disturbance to vegetation during road construction may degrade permafrost or ice rich soils and result in ground thawing and terrain instability
- Ground disturbance at stream crossings may increase sediment inputs to streams, degrade water quality and impact fish and aquatic life

3.4.1.1 Developer's submissions

The developer has committed to following the operational statements associated with snow and ice crossings, temporary crossings and clear spans which includes the mitigation measures included in those statements (PR#392 p8-9). Clearing of new re-aligned portions of the access as well as existing sections with natural re-growth will be required. This will occur under frozen ground conditions and winter road construction techniques will be used to protect the ground surface and not disturb the organic mat as described in Appendix B IR2 Responses (PR#343 Appendix B pp5-7). Canadian Zinc Corp. has made many commitments that are intended to mitigate the impacts road construction. These commitments are described in the Final Commitments Table of Canadian Zinc Corp.'s *Comments of Final Arguments* submission (PR#470 p 17-20).

3.4.1.2 Parties' submissions

Winter road construction techniques are described in the Developer's Assessment Report, in Appendix B of information request 2 Responses (PR#343) and in commitments the developer made on road construction and operation methodology to mitigate adverse impacts (PR#353 p2-11). These operational techniques, design mitigations and commitments will be required to mitigate adverse impacts to permafrost, soils, vegetation and land disturbance along the winter access route. The Review Board considers these commitments by Canadian Zinc Corp. to form part of the scope of development for access road construction and operation.

The developer established that permafrost and ice rich soils may exist in areas of sloping ground along the proposed route re-alignments where side hill cuts may be required. According to Canadian Zinc Corp., further geotechnical investigations may be needed during the detailed design phase to understand the potential for ground instability and decide the appropriate mitigation measures. Natural Resources Canada recommends that the developer should commit to these geotechnical investigations as proposed in the Developer's Assessment Report, Appendix 16 (PR#391 p15-17).

In its technical report, AANDC states that in its opinion, construction of the access road should only commence after frozen ground conditions have been confirmed and operations should cease when unfrozen conditions are imminent. In AANDC's view, the developer should accomplish this through local measurements of ground conditions by the installation of ground temperature cables in vegetation zones along the winter access route. Local ground measurements would be used to define the duration of the operating season of the road where frozen conditions are relied upon. AANDC states that significant adverse impacts to land disturbance during construction and operations could occur if the following recommendations are not implemented:

> "AANDC recommends that local ground temperature measurements define the commencement of road construction activities using equipment other than low

pressure ground vehicles, in areas where road construction relies on frozen ground", and

"AANDC recommends that local ground temperature measurements define the duration of the road operating season, in areas where road operation relies on frozen ground". (PR#389 pp38-40)

Natural Resources Canada also submitted recommendations to reduce impacts to land and water from construction and operation of the winter road. In its technical report, Natural Resources Canada states that it supports the recommendations of the developer's consultant that are provided in the Developer's Assessment Report, Appendix 16 (Terrain Assessment Report). These recommendations include a geotechnical investigation prior to the final design phase of the road (PR# 391 p16). The technical report from Natural Resources Canada also recommends that environmental management plans for the access road should include a toolbox of mitigation options with criteria for when they could be used.

In its response to these recommendations from AANDC, Canadian Zinc Corp. supports the opinion of its winter road construction consultant, Kledo Construction of Fort Nelson, that the use of ground temperature measuring devices is unnecessary. As stated in the comments on government agency technical reports, "Kledo Construction is unaware of any other locations or projects that require the installation of ground temperature cables to measure ground temperature (frozen conditions) to determine weight bearing capacity" (PR470 p4). Canadian Zinc Corp. goes on to state that inspectors and operators are better able to make decisions on when the road is suitable for use by using experience and by observing ground conditions. (PR#470 p4-5) In a similar response to Natural Resources Canada's recommendation for a toolbox of mitigation options, Canadian Zinc Corp. states that they believe it is inappropriate to predetermine a mitigation option for a specific environmental management issue and that a given response is best decided by the qualified and experienced general road foreman (PR#470 Attachment 1 p17).

In its September 16, 2011 response to government agency technical reports, Canadian Zinc Corp. states that they intend to investigate specific areas that might contain permafrost along the proposed road re-alignments. However, Canadian Zinc Corp. does not consider permafrost investigation of the existing road alignment to be necessary. For the proposed re-alignment sections, road investigations will include the installation of thermistors and the developer will use the results to decide suitable road and construction/operation methods (PR#470, Attachment 1, p5). In addition, a geotechnical investigation will take place during the final design of the winter road (PR#470 Table 1 p18). Canadian Zinc Corp.'s Final Commitments Table includes other commitments intended to mitigate impacts of construction and operation of the winter road on land and water both inside and outside the park.

3.4.1.3 Review Board's analysis and conclusions

The Review Board acknowledges that the rationale for these recommendations from AANDC and other parties is that Canadian Zinc Corp. proposes to extend the duration of the transportation season of the winter road to November 1st to March 31, which is beyond the typical winter road operating season in the Northwest Territories. Extending the duration of winter road operating season could have significant adverse impacts on the organic mat, stability of permafrost and ice-rich soils and land disturbance along the route. The Review Board is satisfied the proposed design of the winter access road along with the developer's commitments for road construction and operation will mitigate adverse impacts on land along the route. The Review Board also acknowledges that Parks Canada and the Mackenzie Valley Land and Water Board have the authority and mechanisms to regulate activities along the winter road to adequately address concerns raised.

The Review Board finds that Canadian Zinc Corp. has addressed the impacts from winter road construction and operation during the course of the environmental assessment through responses to information requests, project design mitigation and commitments. Important commitments from the developer in the Review Board's findings include the detailed geotechnical investigation of re-aligned sections of the route during the final design phase prior to construction. The Review Board finds that there is not likely to be a significant adverse impact to the environment from construction and operation of the winter access road.

3.4.2 Aggregate extraction

3.4.2.1 Developer's and parties' submissions

Parties including Parks Canada, raised concerns throughout the analytical phase of this environmental assessment of the location and amount of aggregate sources for construction and operation of the access route and the transfer facilities. Aggregate extraction sites are also called gravel pits. The location of possible gravel sources were documented on maps in Appendix C of Canadian Zinc Corp. responses to the second round of information requests (PR#343 App C).

Two of the locations are within Nahanni National Park Reserve. The developer provided volume estimates of aggregate requirements. The Tetcela Transfer Facility will require approximately 6,000 m^3 of aggregate sourced from the Sundog Creek Valley within Nahanni National Park Reserve (PR#261 p5). Canadian Zinc Corp. estimates a total volume of 50,000 m^3 of gravel for the construction of the entire access road, with a small portion of that amount required for the road within the park.

Extraction of borrow material near water bodies can have adverse impacts on fish and fish habitat. To mitigate these impacts, the developer has committed that "sources of gravel will not be situated in river beds or within the high water mark of alluvial fans" and that

"no additional access roads and/or crossings will be required to access aggregate sources" (PR#470 Table 1 p13).

Gravel pits can also cause large visual scars, particularly in areas above the treeline, and adversely impact the viewshed in Nahanni National Park Reserve. In its final submission, Parks Canada recommends specific mitigation regarding the distance that gravel may be removed from the road bed (two metres), slope restoration after extraction, amount of aggregate to be removed and aesthetics in order to reduce these impacts (PR# 464 p14-15).

The developer does not support the restrictions proposed by Parks Canada on gravel extraction or maximum limits proposed for extraction within the Nahanni National Park Reserve. In the view of the Canadian Zinc Corp., the two metre restriction for gravel removal from the road bed is unreasonable and they oppose limits on the amount of gravel to be removed within the park (PR#470 p8).

3.4.2.2 Review Board's analysis and conclusions

In the view of the Review Board, further specifics on gravel pit locations and operations can be addressed by the developer in the detailed design phase during the construction of the access road both within and outside the Nahanni National Park Reserve. Proposed design mitigations measures and commitments made by Canadian Zinc Corp. are important in the findings of the Review Board.

The Review Board finds that the aggregate development proposed by Canadian Zinc Corp. including its commitments is not likely to have significant adverse impacts to the environment.

3.4.3 Access road spills

3.4.3.1 Developer's and parties' submissions

During the winter haul season materials including diesel fuel, sulphuric acid, mine reagents, cement and other materials will be trucked into the mine while bags of lead and zinc concentrate will be trucked out to the highway. There is the risk of these materials spilling during transport along the winter road, particularly in steeper mountainous terrain where probability and consequences of a spill are heightened. Approximately 77 kilometres of the 175 kilometre winter access road is within Nahanni National Park Reserve. Parks Canada states in its technical report that two separate spills occurred during initial use of the winter access road (PR#390, p4-5). Ecologically important values within Nahanni National Park Reserve such as bull trout spawning and karst terrain could potentially be impacted by spills.

Due to concerns with the risk of spills in Nahanni National Park Reserve in the area of karst features, Parks Canada provides several recommendations for monitoring of the approximately ten kilometre section of road near kilometre 56, where it passes adjacent to karst landscape in the vicinity of Polje Creek. Karst landscape refers to underground limestone drainage systems including depressions and sinkholes that may be at risk in a spill scenario. Parks Canada's monitoring recommendations include an initial recording and monitoring of sinkhole and karst subsidence features as well as monitoring of surface water flow and quality and groundwater (PR#390 p13).

In its September 16, 2011 Comments on Final Arguments, Canadian Zinc Corp. addresses these recommendations as follows. Canadian Zinc Corp. agrees that adequate monitoring of the impacts of a spill and the effectiveness of cleanup should occur in the karst region, but need not be any different than other segments of the winter access road (PR#470 p12). The developer has committed to monitoring of the sinkhole features as described in its reply provided by consultant Golder Associates to Parks Canada's first round information request 9.3 (PR293, Appendix D p6 and PR#470 Attachment 1 p12-13). The developer agrees with flow monitoring from the perspective of sedimentation and erosion control, but noting that the road is winter only, do not support the extent of monitoring of water flow or water quality as proposed by Parks Canada. Canadian Zinc Corp. does not support monitoring groundwater in the karst region as it is considered impractical. (PR#470 012-13)

In its response to second round information requests, Appendix I, Canadian Zinc Corp. presents a document titled *Spill Assessment and Contingency Planning*. In this document, Canadian Zinc Corp. commits to producing a comprehensive Spill Contingency Plan before operations commence. Canadian Zinc Corp. would develop the Spill Contingency Plan developed with reference to the INAC 2007 *Guidelines for Spill Contingency Planning*. (PR#343, Appendix I) The developer has made numerous other commitments to reduce the risk of spills including improvements to road design and operations (PR#470 p17-20).

Canadian Zinc Corp. also prepared a spills risk assessment as part of the Spill Assessment and Contingency Planning Document. This risk assessment includes a listing of materials along with quantities of materials that would be hauled in addition to an assessment of spill risk and consequence along the access road (PR#343, Appendix I).

3.4.3.2 Review Board's analysis and conclusions

The Review Board notes that the road re-alignments proposed by Canadian Zinc Corp. avoid the karst features, steep sections and areas of potentially unstable terrain and will reduce the risk spills along the winter access road. The Review Board acknowledges the commitments Canadian Zinc Corp. proposes to reduce the likelihood of spills as well as the developer's plans to address the impact of any spills in the event that they occur. The Review Board finds that provided the developer implements the winter road re-alignments

and commitments as proposed, the development is not likely to have significant adverse impacts from spills to the environment.

3.4.4 Concentrate dispersal during transport

3.4.4.1 Developer's and parties' submissions

At the mine site, lead and zinc concentrate will be loaded into bulk bags each containing approximately 3.5 tonnes of concentrate. The bags will remain sealed and stored in the concentrate shed at the mine until the winter haul season (PR#255, p190-191). The bags will be transported on flat deck trailers along the winter road to the Tetcela Transfer Facility (approx. km 85) and stored there until transported to the Liard Transfer Facility near the Liard Highway. Due to the multiple storage locations the bagged concentrate must be moved on and off flat deck transport trucks several times and is the most practical solution to concentrate transport. The developer describes its concentrate bagging and transport strategy further in its response to first round information requests from Environment Canada and Government of the Northwest Territories (PR#293 p 46-47 and Appendix N).

In its technical report, Environment Canada concludes that there is the potential for the release of contaminants to the environment from the handling and transport of lead and zinc concentrates. Fugitive dust from the transport of concentrates can result in contaminant loading to land and water. Environment Canada specifically identifies potential impacts to land and water from the transport of concentrate from the following sources:

> "Tracking along road – ore concentrate can be tracked out of loading and unloading facilities on haul truck tires and other truck surfaces and subsequently deposited onto the road"; and
>
> "Concentrate spillage and escapement from haul trucks – this includes leakage from bags of concentrate, blowing of dust collected on the outside of the bags of concentrate on the trucks, or spillage from overturned trailers following accidents". (PR#386 p18-19)

In its technical report, Environment Canada provides the specific examples of the Red Dog mine in Alaska and the Pine Point mine in Northwest Territories to demonstrate the link between the transport of concentrate and contaminant loading into the environment. To mitigate the impacts of concentrate loss into the environment, Environment Canada recommends that Canadian Zinc Corp. develop and implement a Contaminant Loading Management Plan in consultation with Environment Canada and Government of the Northwest Territories (PR#386 p 20-21). In addition, Environment Canada recommends that Canadian Zinc Corp. employ secondary containment on the flat deck trailers during

transport of mitigate spillage of escapement of concentrate from the bags due to bag malfunctions or accidents (PR#386 p21).

In its final submission, Environment Canada reiterates its concern that concentrate-related contamination along the access road is an outstanding issue. Environment Canada's position is that the bags proposed for concentrate transport are susceptible to tearing in the conditions that would be experienced during the proposed winter haul season and the bags seals are neither durable nor air-tight (PR#462 p. 2). Parks Canada supports the two recommendations proposed by Environment Canada to address contaminant loading .

In its Comments on Government Agency Technical Reports, Canadian Zinc Corp. agrees to preparing a Contaminant Loading Management Plan, apart from reporting frequency that was recommended by Environment Canada (PR#470 p8). In its Comment on Final Arguments, Canadian Zinc Corp. notes that the concentrate will leave an unheated shed in a frozen state and will remain frozen during transport. The developer does not support secondary containment on the flat deck trailers during transport of lead/zinc concentrate because it is not necessary or practical (PR#470 6-7).

The developer has made commitments in order to reduce the impacts of concentrate dispersal along the winter access road. For example, Canadian Zinc Corp. states that trucks will drive by, not through, the concentrate storage shed at the mine so that they do not track concentrate out of the building (PR#293 p46). In its final Commitments Table, the developer commits that "The access road bed will be sampled before and after the seasonal haul period as a check on potential contamination from concentrate losses (PR#470 p 19). In addition, Canadian Zinc Corp. commits to make changes to the bag method of concentrate transport if assumptions on contaminant loading are wrong (PR#470 p7).

The Review Board understands that Parks Canada has the mechanisms to regulate activities within Nahanni National Park Reserve, including along the road, to protect national park values.

3.4.4.2 Review Board's analysis and conclusions

The Review Board acknowledges the commitments made by the developer to mitigate adverse impacts to land and water from the transport of concentrate along the winter access road. An important commitment from the developer in the Review Board's findings is the preparation of a Contaminant Loading Management Plan in consultation with Environment Canada and Government of Northwest Territories.

The Review Board notes that methods of secondary containment for the transport of concentrate to reduce or eliminate concentrate leakage are available and that 77 kilometres of the winter access road pass through Nahanni National Park Reserve. The Review Board finds that the transport of concentrate as proposed by the developer with

associated commitments is not likely to have significant adverse impacts on the environment.

Suggestion #3

The Review Board recognizes that there are better ways to contain concentrate during transport along the winter road than the bag method proposed by the developer. The Review Board suggests that the developer use secondary containment of concentrate during transport along the winter access road to reduce the risk of contaminant dispersal. The Mackenzie Valley Land and Water Board and Parks Canada can best address this during the regulatory phase.

3.5 Impacts to wildlife from access road construction and operation and mining

Impacts to wildlife from activities at the mine site and transport along the winter access road were described and assessed by Canadian Zinc Corp. in its Developer's Assessment Report and accompanying appendices. The Developer's Assessment Report contained a Vegetation and Wildlife Assessment Report which included an assessment of the impacts of project activities on species at risk and proposed mitigation to address those impacts (PR#255 Appendix 17). An updated draft Wildlife Management Plan dated February 23, 2011 was included in the developer's responses to the second round of information requests. This document is also referred to as the Wildlife Mitigation and Monitoring Plan by parties and Canadian Zinc Corp. in later correspondence. Canadian Zinc Corp. responded to information requests from parties formally in written submissions in September 2010 and March 2011 as well as in technical meetings. Throughout the analytical phase of the environmental assessment the developer made commitments to address impacts to wildlife from activities at the mine site as well as construction and operation of the winter access road.

Impacts to wildlife considered in this section include:

- Disturbance and displacement effects from road operation on caribou
- Disturbance and displacement effects from activities at the mine site
- Increased access may result in increased hunting pressure and direct mortality of wildlife
- Impacts to species at risk

The *Species at Risk Act* creates responsibilities for the Review Board in addition to those of the *Mackenzie Valley Resource Management Act*. If a project is likely to affect a listed species or its critical habitat, the Review Board must identify the adverse effects the project may have on listed wildlife species and its critical habitat and, if the project is carried out

ensure that measures are taken to avoid or lessen those effects and to monitor them (*Species at Risk Act* ss. 79(2)).

3.5.1 Parties' submissions

In its technical report, Environment Canada provides a list of species at risk that could be impacted by the Prairie Creek Mine and advises that according to the *Species at Risk Act,* specific actions must occur during the assessment of the environmental effects of a project (PR#386 p29). Environment Canada notes that the list of species at risk in Canadian Zinc Corp.'s updated Wildlife Management Plan reflects the most recent species designations and listings by both *Species at Risk Act* and the Committee on the Status for Endangered Wildlife in Canada. To mitigate impacts to ground-nesting migratory birds, Environment Canada presents recommendations on the timing of vegetation clearing and road-bed preparation during project construction activities. Specifically, Environment Canada recommends that vegetation clearing for the road and waste rock pile occur prior to May 7 or after August 10 to avoid the migratory bird breeding season (PR#386 p31-33).

Impacts to woodland caribou, including disturbance and displacement and direct mortality, from large volumes of traffic during the operation of the winter access road were considered in this environmental assessment. Woodland caribou are divided into two types, mountain caribou and boreal caribou. Mountain caribou are listed on Schedule 1 of the federal Species at Risk Act as Special Concern while boreal caribou are listed as Threatened.

In its Final Submission, the Government of the Northwest Territories state that the mountain caribou herd whose range most likely overlaps the mine site and vicinity is the Redstone Herd. This population of mountain caribou is estimated to be stable at 5,000-10,000 animals (PR#460 p6). The Government of the Northwest Territories notes that surveys conducted in December 2010 and February 2011 found that the main concentrations of the herd were north and west of the mine site with only a few woodland caribou near the first five to ten kilometres of the winter access road. In the view of the Government of the Northwest Territories, use of the access road and related activities would have limited significant impact at a population level for the Redstone herd (PR#460 p6). In its final submission, the Government of the Northwest Territories states that it supports the Wildlife Mitigation and Monitoring Plan along with the Technical Advisory Committee proposed by Canadian Zinc Corp. as the appropriate approach and method to define mitigation measures that would minimize impacts to woodland caribou (PR#460 p6).

The Government of the Northwest Territories notes that distribution of boreal caribou near the access road (eastern portion) to the mine site but that anecdotal information indicates that there is minimal overlap between the range of boreal caribou and project activities. As with woodland caribou, the Government of the Northwest Territories believes that the appropriate follow-up program to develop mitigation measures that will minimize impacts

to boreal caribou and resolve possible future impacts is the approach proposed in the developer's Wildlife Mitigation and Monitoring Plan (PR#460 p7).

Approximately 77 kilometres of the western portion of the winter access road passes through Nahanni National Park Reserve. This portion is not a public road. Recommendations were submitted by Parks Canada to mitigate impacts from use of the winter access road on wildlife, particularly woodland caribou. Specific recommendations from Parks Canada in its technical report and final submission included ways to manage traffic when wildlife are on or near the road and wildlife monitoring (PR#309 p15-17 and PR#464 p7-8).

Parties, including the Nahanni Butte Dene Band, the Government of the Northwest Territories and Parks Canada have identified that opening up the long-abandoned winter access road to the Prairie Creek Mine may result in increased hunting pressure on wildlife. Increased access by the public along the winter road can result in direct mortality to wildlife. In its technical report and throughout the environmental assessment, Nahanni Butte Dene Band has maintained the position that some type of access restriction or deterrent to public use of the winter road is required to mitigate impacts of overhunting wildlife (PR#388 p18). Nahanni Butte Dene Band notes that since legislation administered by AANDC does not allow for public access control, Nahanni Butte Dene Band is willing to operate a check-point near the eastern end of the access road as a means of mitigating impacts to wildlife from overhunting.

Dall's sheep are present in the immediate vicinity of the Prairie Creek mine and airstrip. Noise from mine operations and aircraft landings and takeoffs could have an adverse impact on sheep. In its technical report, the Government of the Northwest Territories notes that the developer has made commitments to mitigate impacts to Dall's sheep, including updating the existing Flight Impact Management Plan as well as a Dall's sheep monitoring program to ensure project related impacts to sheep are minimized (PR#394, Archaeology and Wildlife Technical Report p11).

3.5.2 Developer's submissions

In its Comments on Government Agency Technical Reports, Canadian Zinc Corp. states that its draft Wildlife Management Plan outlines approaches to minimize impacts to wildlife and species at risk. In response to a recommendation from Environment Canada, Canadian Zinc Corp. commits to incorporating government agency (such as Environment Canada, Parks Canada, the Government of the Northwest Territories-Environment and Natural Resources Division) comments into Plan revisions and consulting with government agencies when additional mitigation measures are identified for species at risk (PR#470, Attachment 1, p9-10). The draft Wildlife Management Plan is based on the adaptive management approach and includes monitoring including the monitoring of woodland and boreal caribou and Dall's sheep (PR#343, Appendix K).

In its Comments on Government Agency Technical Reports, Canadian Zinc Corp. commits to carry out vegetation clearing and roadbed preparation for new sections of the access road outside of the migratory bird breeding season as recommended by Environment Canada. If an active migratory bird nest is found, Canadian Zinc Corp. commits to establishing a no-work buffer and will follow the Canadian Wildlife Service's Active Migratory Bird Nest Survey protocols. Canadian Zinc Corp. does not agree with the same timing window restriction for the waste rock pile because its footprint is sparsely vegetated, previously disturbed with access roads and drill pads, is used annually and has low potential for migratory bird presence. (PR#470 Attachment 1 p10)

The developer states in its Comments on Government Agency Technical Reports that recommendations provided by parties (Parks Canada, Government of the Northwest Territories) to mitigate impacts to wildlife along the access road and at the mine site are to be addressed in the Wildlife Mitigation and Monitoring Plan (PR#47-16). In response to prescriptive recommendations regarding traffic management and wildlife from Parks Canada, Canadian Zinc Corp. "commits to work with regulators and to incorporate the appropriate legislative and regulatory details in to the Wildlife Mitigation and Monitoring Plan as required" (PR#470 p14).

The Technical Advisory Committee as proposed by Canadian Zinc Corp. will be used as a forum to review mine operations, consider monitoring data and decide on any need for adaptive changes (PR#343 Appendix J). This Committee will have representation from regulatory agencies as well as aboriginal organizations. As described in Canadian Zinc Corp.'s Final Commitments table, the draft Wildlife Mitigation and Monitoring Plan will be updated during the permitting process and changes will be considered and discussed in the forum of the Technical Advisory Committee (PR#470 Table 1, p12).

Canadian Zinc Corp. includes control of access road use in its Wildlife Mitigation and Monitoring Plan, also referred to as a "draft Wildlife Management Plan" in Appendix K of its responses to Second Round Information Requests (PR#343 Appendix K p15). In particular, in the Final Commitments Table, Canadian Zinc Corp. commits that "Non-mine traffic will be deterred from using the road by signage and operating a check-point and screening station near the south-eastern terminus of the access road, manned by representatives from the Nahanni Butte Dene Band" (PR#470 p15). As noted above, the Nahanni Butte Dene Band support this commitment by the developer as a way to reduce impacts to wildlife from increased access and over-hunting.

3.5.3 Review Board's analysis and conclusions

The Review Board has reviewed the submissions by parties and the developer in its consideration of impacts to wildlife from construction and operation at the mine site and construction and operation of the winter access road. The Review Board notes the many commitments made by Canadian Zinc Corp. through analytical phase of the environmental

assessment and in its Final Commitments Table and responses to parties technical reports and final submissions.

The Review Board agrees with the approach to the mitigation of impacts to wildlife from the mine site activities and construction and operation of the access road as proposed in the developer's Wildlife Mitigation and Monitoring Plan. The Review Board finds that the developer can achieve specifics on mitigation techniques and any required revisions based of those mitigation techniques as a result of monitoring through adaptive management as described in the Wildlife Mitigation and Monitoring Plan. The Review Board finds that there is not likely to be significant adverse impacts to wildlife, including species at risk, provided Canadian Zinc Corp. implements the Wildlife Mitigation and Monitoring Plan with its commitments.

3.6 Impacts to the environment after mine closure

3.6.1 Developer's and parties' submissions

There is the potential for long-term impacts to water quality from the Prairie Creek Mine after mine operations are complete and the project enters the closure and post-closure phases. Canadian Zinc Corp. submitted a *Draft Preliminary Closure and Reclamation Plan* as an appendix to its Developer's Assessment Report. The plan briefly considers temporary mine closure and permanent closure and reclamation. Key components of the plan include the complete filling of the underground mine, removal of all tailings temporarily stored in the water storage pond for placement underground, covering the water rock pile and removal of site facilities unless local communities or Parks Canada request otherwise (PR#255 Appendix 27). Research and monitoring during operations are proposed by the developer to update predictions on the behavior of the tailings paste backfill, refinement of metal leaching predictions from various sources, waste rock pile cover design and groundwater and surface water quality prediction after mine closure.

In its Developer's Assessment Report, Canadian Zinc Corp. states that it referred to the *Mine Site Reclamation Policy for the Northwest Territories (INAC 2002),* and *Mine Site Reclamation Guidelines for the Northwest Territories (2007)* in the preparation of the Plan (PR#255 p329).

In its technical report, AANDC states that the draft closure plan is not sufficient to address many of its concerns, in particular the amount and quality of post closure mine water and the quality of seepage water from the waste rock pile after closure. AANDC also notes that the closure plan does not discuss the potential for tailings to be stored on surface in the Prairie Creek floodplain post closure. AANDC recommends that post closure water quality must meet site specific water quality objectives once those objectives are established (using the reference condition approach). In addition, AANDC recommends that Canadian Zinc Corp. develop a Preliminary Closure and Reclamation Plan during the regulatory

phase prior to water license issuance. Canadian Zinc Corp. must develop that Plan in consultation with regulators, stakeholders and other parties in accordance with the 2007 Mine Site Reclamation Guidelines. (PR#389 p27-29)

In it Comments on Government Agency Technical Reports, Canadian Zinc Corp. agrees with the AANDC recommendation that post closure water quality must meet objectives that are protective of the environment, but not that they must be based on the reference condition approach. With respect to the Closure and Reclamation Plan, Canadian Zinc Corp. does not support the preparation of a document, beyond what it has already provided, during the regulatory phase because it would only be a consolidation of existing information. Canadian Zinc Corp. states that it has answered the key closure planning questions and that it will be collecting monitoring data during initial mine operations to update predictions of post-closure impacts. Canadian Zinc Corp. recommends that it updates the existing Closure and Reclamation Plan after 5 years of operations during Water License renewal when the results from updated predictions are available (PR#470, Attachment 1 p3-4).

The winter access road from the mine site to the Highway is part of the scope of the Prairie Creek mine development. In its technical report, AANDC clearly identifies the need to include the entire length of the access road in closure and reclamation planning. The report identifies post-closure issues including erosion and sediment transport into watercourses, slope failures and permafrost degradation. To mitigate these adverse impacts so that they are no longer significant, AANDC recommends that the Closure and Reclamation Plan include the entire length of the road (PR# 389 p49). In response, Canadian Zinc Corp. states that they agree that a closure and reclamation plan should include the entire road and transfer facilities as well (#PR470 Attachment 1 p6).

3.6.2 Review Board's analysis and conclusions

The Review Board believes that the closure and post-closure phases are key components in the overall long-term plan for the Prairie Creek Mine project. The Review Board acknowledges that specifics on closure planning will require operational experience, monitoring and testing in order to verify various predictions made by the developer particularly in terms of long term water quality. The Review Board notes commitments made by Canadian Zinc Corp. on closure planning and notes that Guidelines on Closure and Reclamation planning are available from AANDC.

The developer's commitment to place all tailings underground as paste backfill at closure is important with respect to impacts to the environment after closure. The Review Board finds that it is not likely that the development will have significant adverse impacts to water quality or the environment during the closure and post-closure phases of the project provided the developer's commitments are followed.

3.7 Impacts to the environment from flooding, slope stability and emergencies

This section considers impacts to the environment at the mine site from flooding and emergencies associated with the proposed exfiltration trench in Prairie Creek. This section makes specific reference to the design of the water storage pond(s) and berms with respect to flood design and the emergency scenario where direct discharge into Harrison Creek is considered in the event of a malfunction with the exfiltration trench effluent outfall system.

3.7.1 Flood Design and dam safety standards

3.7.1.1 Developer's and parties' submissions

The developer has committed to increase water storage capacity at the mine site by either raising the dykes at the existing pond or by constructing a second water storage pond approximately 700 metres downstream from the existing mine site. In its final submission, Parks Canada recommends that the developer expand the existing pond or construct a second pond for a 1 in 1,000 year flood and a 1 in 1,000 year earthquake. In addition, the developer should design back slopes to ensure adequate stability from landslides and earthquakes (PR#464 p 10-11). In its final submission, AANDC recommends the developer follow the Canadian Dam Association guidelines in the construction of enhancements to the existing pond or construction of a second pond (PR#466 p6).

In its Comments on Final Arguments, Canadian Zinc Corp. states that with respect to seismicity, the assumptions that have been made are consistent with a 1 in 1,000 year earthquake. In its Final Commitments Table, Canadian Zinc Corp. commits to completing a deterministic hazard assessment during the detailed design phase of the project.

However, Canadian Zinc Corp. believes that the 1 in a 1,000 year flood design as recommended by Parks Canada is not warranted. In its Comments on Final Arguments, consultants to the developer state that they believe this recommendation comes in part from a document that describes the development of a national dam safety standard for Parks Canada (PPR#470 p10). The document is not referenced in the Parks Canada's submission.

On behalf of Canadian Zinc Corp., Northwest Hydraulics state that Parks Canada has not provided information to suggest that the consequences of a dam failure warrant the classification that would justify a 1000 year inflow flood design (PR#470 p 11). Northwest Hydraulics Consultants further states that they believe there will be sufficient storage to hold a 1,000 year inflow from the local drainage, even though inflow design flood criteria do not apply to the existing or proposed water storage reservoirs at the mine site. Since inflow design flood criteria do not apply to bank protection designs, in the opinion of

Northwest Hydraulics, it is appropriate to design water storage pond bank armour for the 200 year recurrence flow which is the current design standard for the existing berm. Northwest Hydraulics therefore recommends that the 200 year flood be used for design of the rip rap protection on the outer side of the berm for the pond(s) as it is consistent with the standard of the existing berm protection and should satisfy normal regulatory requirements (PR#470 p12).

3.7.2 Stability of the water storage pond and back slope

3.7.2.1 Developer's and parties' submissions

Stability of the existing water storage pond and the adjacent back slope has been a concern at the mine site since the facility was constructed in 1981. A history of the water storage pond, the instability of the north slope along with a summary of past investigations and studies is provided in Appendix 12 of the Developer's Assessment Report (PR#255). The re-design of the existing pond and possible construction of a second pond must be stable over the long term.

In its technical report, Natural Resources Canada agrees that the developer has done considerable work to ensure that the re-engineered water storage pond remains stable and performs as intended. Natural Resources Canada recommends that the developer incorporate additional geotechnical and instrumentation work recommended by the developer's consultant into the final design of the facilities (PR#392 p18-20).

In its response to second round information requests, Canadian Zinc Corp.'s consultant responded to requests from Natural Resources Canada on geotechnical issues with the water storage pond. They note that a monitoring and mitigation plan will be prepared as part of final design. Canadian Zinc Corp. has also made commitments on re-engineering of the water storage pond and remediation of the north (or back) slope in its Final Commitments Table. A non-engineered drawing of the water storage pond with fill apron and buttress for the back slope is found in Appendix F of the responses to second round information requests document (PR#343 Appendix F p51).

The conceptual design for an expansion to the existing water storage pond is presented in the August 2, 2011 document "Consideration of Additional Water Storage Options" (PR#447). The document presents pond expansion options including an alternative operating water elevation range, excavation of material from the back slope and stabilizing the clay layer or raising the embankments (berms). For any of these alternatives, additional site investigations are required before these alternatives can be considered (PR#447 p3).

3.7.3 Emergency use of Harrison Creek for mine effluent discharge

3.7.3.1 Developer's and parties' submissions

In its technical report, AANDC states that there is the potential for complications to arise for mine effluent discharge from the exfiltration pipe(s) in the bed of Prairie Creek. In the event that there are problems with the pipe or effluent mixing in the creek, AANDC contends that mining must stop and the developer address the issue immediately. Direct discharge of mine effluent from the culvert into Harrison Creek would not benefit from the mixing achieved by the exfiltration trench in the initial dilution zone of Prairie Creek and water quality objectives may not be met. To this end AANDC recommends that:

> "no effluent be discharged via the culvert into Harrison Creek unless an emergency situation has been declared for the site by the Mackenzie Valley Land and Water Board (Land and Water Board). Any discharges to Prairie Creek via Harrison Creek must be short term in duration to avoid potentially increased effects to the environment from the mine site. During this scenario a specific Emergency Plan, approved by the Land and Water Board, must be followed by Canadian Zinc Corp. This Emergency Plan should include a complete shut down of mining and milling operations." (PR#389 p24-25)

The developer responds to the emergency effluent discharge scenario described by AANDC in its Comments of Final Arguments submission. Canadian Zinc Corp. believes it is impractical to require a declaration of emergency by the Mackenzie Valley Land and Water Board prior to effluent discharge into Harrison Creek due to the short notice of an emergency situation that would require discharge via the culvert into Harrison Creek. Canadian Zinc Corp. agrees that an emergency discharge should be of short duration but disagree that discharge should include the shutdown of mining and milling operations. Canadian Zinc Corp. does support a restriction of not releasing treated water to the Catchment Pond during a discharge to Harrison Creek (PR#470 Attachment 1 p3).

3.7.4 Overall Review Board's analysis and conclusions on flooding, slope stability and emergencies

The Review Board has considered the submissions of Parks Canada and Canadian Zinc Corp. with respect to flood design standards for the water storage pond(s) and the berms along Prairie Creek. The Review Board finds that construction of the water storage pond(s) and the berms to a 1 in 200 year flood design as proposed by the developer's consultants, Northwest Hydraulics is consistent with current design at the site. In addition, the Review Board notes the commitments made Canadian Zinc Corp. with respect to protection from earthquakes and landslides. The Review Board finds that the flood design standard as proposed by the developer is sufficiently conservative to mitigate impacts on the structural

integrity of built structures at the site and that the design as proposed is not likely to have significant adverse impacts to the environment.

The Review Board notes the considerable work that the developer and its consultants have done to address stability issues in preliminary re-engineering design of the existing water storage pond and back slope. The Review Board finds that if properly designed and operated as proposed by the developer, the water storage pond and back slope design is not likely to have significant adverse impacts on the environment.

The Review Board acknowledges that emergency situations may require effluent discharge that may not meet water quality objectives for short time periods. The Review Board notes that regulators may require the shutdown of mining and milling operations during these emergency events. The Review Board is of the view that addressing emergency events is a regulatory matter that will be appropriately considered for this project and its location by the Mackenzie Valley Land and Water Board during the water licensing phase. The Review Board finds that the development as proposed by Canadian Zinc Corp. is not likely to have significant adverse impacts on the environment.

3.8 Impacts on the human environment

The developer conducted a Socio-Economic Impact Assessment (SEIA) for the Prairie Creek Mine as part of its Developer's Assessment Report in Appendix 19. In this document, Canadian Zinc Corp. predicts the level of employment and business opportunities for communities in the study area and how the project may impact the well-being of those communities and its residents. The developer also predicts social effects related to the mine and proposed mitigation measures to address those impacts. (PR#255, Appendix 19) Canadian Zinc Corp. states that its "socio-economic mitigation strategy was developed with the goal of maximising local participation and benefits, while mitigating or reducing any negative impacts from participation in this project" (PR#255 p23).

The developer's socio-economic impact assessment concludes that "the economic growth that the Prairie Creek Mine will bring to the region offers an opportunity to initiate positive and sustainable socio-economic change throughout the Study Area" (PR#255 p326).

During the course of the environmental assessment, separate impact benefits agreements were signed between the developer and the Nahanni Butte Dene Band of the community of Nahanni Butte and Liidlii Kue First Nation of Fort Simpson. These two impact benefits agreements are confidential arrangements between Canadian Zinc Corp. and the respective aboriginal organizations and do not form part of the public registry. The Review Board therefore did not consider the content of the Impact Benefits Agreements but did take into account the existence of these agreements because they were mentioned during the hearings and in parties' written submissions.

3.8.1 Developer's and parties' submissions

In its technical report, the Government of the Northwest Territories states that though they generally agree with Canadian Zinc Corp.'s assessment of socio-economic impacts, they conclude that some of the predicted impacts remain uncertain. The Government of the Northwest Territories also notes that the proposed mine is a significant non-renewable resource development for this region of the Mackenzie Valley, that the mitigation proposed is untested in this region and by this developer and that adaptive management of socio-economic impacts and proposed mitigation may be required. The Government of the Northwest Territories therefore recommends that a socio-economic follow-up program is required. The Government of the Northwest Territories recommends in its technical report that a socio-economic agreement between the developer and the territorial government is required prior to license issuance during the regulatory phase of the project. (PR#394 p6)

In its technical report, the Government of the Northwest Territories provides an appendix that lists commitments Canadian Zinc Corp. has made on socio-economic values in its May 6, 2011 Commitments Table. In addition, the Government of the Northwest Territories

provides a list of commitments that Canadian Zinc Corp. had not included in the May 2011 table but which the Government of the Northwest Territories identified in other material submitted by the developer during the course of the environmental assessment. (PR#394)

On August 22, 2011 the Prairie Creek Mine Socio-economic Agreement between the Government of the Northwest Territories and Canadian Zinc Corp. was signed. The Socio-economic Agreement describes commitments specific to:

- employment practices
- human resource development
- business development
- traditional economy and cultural well-being
- social well-being
- the Prairie Creek Mine Socio-economic Advisory Committee
- monitoring
- adaptive management (PR#458)

In its Final Submission on September 13, the Government of the Northwest Territories states that the socio-economic agreement confirms Canadian Zinc Corp.'s commitments on socio-economic values. The Government of the Northwest Territories notes that they believe the design of the socio-economic elements of the Prairie Creek Mine meet the standards of the Government of the Northwest Territories' *Sustainable Development Policy*. The agreement also provides for ongoing monitoring and adaptive management with respect to socio-economic aspects of the project (PR#460 p2, 10).

During the public hearing in Nahanni Butte on June 22, the Nahanni Butte Dene Band's presentation to the Review Board discussed socio-economic matters. Individual community members also presented their views directly to Review Board members. An excerpt from the hearing by Mr. Redvers on behalf of the Nahanni Butte Dene Band states:

> "with respect to the socioeconomic impacts, the Band is confident that its socioeconomic interests will be adequately addressed through the full implementation of the IBA it currently has with Canadian Zinc" (PR#432, Day 1 p127).

Chief Fred Tesou addressed the Review Board at the hearing in Nahanni Butte and stated that he believes the mine would be beneficial because there are a lot of opportunities to community members for jobs and education (PR#432, Day 1 p145). Other community members expressed their views before the Review Board at the hearing in support of the benefits that the mine would bring to the Nahanni Butte Dene Band.

On June 23-24, 2011 the Review board held public hearings in Fort Simpson for the Prairie Creek Mine. The Review Board allotted time for members of Liidlii Kue First

Nation and other Fort Simpson community members to make statements that were recorded for the public record. Chief Jim Antoine of Liidlii Kue First Nation addressed the Review Board at the hearing and referenced the Impact Benefits Agreement signed with Canadian Zinc Corp. Chief Antoine stated that in his view the mine will become a catalyst for responsible economic development in the region, providing jobs and business contracts. Chief Antoine further noted that Liidlii Kue First Nation have a good working relationship with Canadian Zinc Corp., that economic development and related activities would be beneficial for the region as a whole and that they support the project if it is done in an environmentally responsible manner (PR#432 Day 2 p147-155).

Review Board members heard support for the project from the Member of the Legislative Assembly for Nahendeh, Kevin Menicoche, who noted that the mine could bring significant economic benefits to the Dehcho Region of the Northwest Territories (PR#432, Day 218-221). The Mayor of Fort Simpson, Shaun Whelly, also addressed the Review Board during the hearings. He stated that:

> "The Village of Fort Simpson is satisfied with the extensive review that has been conducted and believes that all major environmental concerns have been properly addressed by Canadian Zinc. The village recognizes the importance of this project in bringing economic development to the region and to the community." (PR#432, Day 2, p224)

During the public hearings, other community members and business owners of Fort Simpson spoke about the benefits that jobs and business opportunities would bring to the Dehcho Region.

3.8.2 Review Board's analysis and conclusions

The Review Board has reviewed the evidence on the public record and finds that there is broad support among aboriginal organizations and communities in the Dehcho Region for the benefits that the Prairie Creek Mine could bring to the Dehcho Region of the Northwest Territories. Canadian Zinc Corp. has worked with communities, in particular the Nahanni butte Dene Band and Liidlii Kue First Nation to build and maintain a long-term positive relationship. These positive relationships have advanced to the point where Impact Benefits Agreements have been signed with both aboriginal organizations.

The Review Board acknowledges the commitments that Canadian Zinc Corp. has made toward mitigating potentially adverse social impacts of the project on First Nations and communities in the region. The Socio-economic Agreement between Canadian Zinc Corp. and the Government of the Northwest Territories is a key document in the Review Board's findings on impacts of the project on the human environment. The Review Board finds that the document is comprehensive and includes monitoring of the implementation of commitments and adaptive management. In the Review Board's view, the Prairie Creek

Mine is not likely to have significant adverse impacts on the human environment of the Dehcho Region or the Northwest Territories provided the developer's commitments are followed and enforced and the Socio-economic Agreement is implemented.

4 Dissenting reasons

Danny Bayha, and Rachel Crapeau, both board members, have submitted the following dissenting reasons. These reasons are the opinion of Danny Bayha and Rachel Crapeau and express these board members' disagreement with the majority opinion of the Review Board. These dissenting reasons do not form part of the Review Board's final decision.

Introduction

We find that we are unable to agree with the majority of the Review Board (the "Majority") in their decision on this Environmental Assessment.

We reach this conclusion because, in our view, the evidence produced by the developer, Canadian Zinc Corp., is inadequate from a legal perspective to provide a sound basis for a conclusion that there will be no significant water quality impacts resulting from this development. Our legal conclusion is based on our view that the Majority gave insufficient weight to the evidence, including traditional knowledge, shared by participants in the Nahanni Butte community hearing and by the Dehcho First Nations through its Grand Chief, in Fort Simpson, especially with regard to the importance of water quality to the Nahanni National Park Reserve), downstream communities and the traditional and cultural uses of these areas, including fisheries.

In our view, there are gaps in the evidence which should have been provided by the developer to fully describe the project, explain its effects, and set out clear mitigation strategies to avoid development impacts. This was the result of an environmental assessment where the scope of development changed as the assessment proceeded, and where many of the structures, processes and plans necessary to mitigate the impacts of this development were only set out as developer's commitments. These commitments were, in our opinion, not explained in sufficient detail to provide the confidence necessary for a decision that there would be no significant water quality impacts from this development.

Appendix B of the Report of Environmental Assessment sets out over 25 pages of commitments from the developer. This is unprecedented in the Review Board's experience. Among them are commitments to implement important structural works to mitigate water quality concerns. The Majority report provides no mandatory framework to ensure that any of these commitments will be undertaken. In the absence of such certainty, we find ourselves unable to agree that significant impacts from this development will be avoided and are unlikely.

The Report of Environmental Assessment

We have carefully reviewed, and take no issue with Parts 1 and 2 of the Report of Environmental Assessment, subject only to the comments we make below about Part 2 of the report below.

The Majority hopes that it can rely on the changes to the scope of development proposed by the Developer (see section 2.4 of the REA) in the form of commitments, as a basis for ensuring that the project is constructed and operated in a way which will minimize impacts to downstream water quality. This, in our view, provides little certainty about the implementation of these critical mitigation measures. This is not appropriate. If the development is set in the appropriate context, both geographically, upstream of a National Park and United Nations Educational, Scientific and Cultural Organization World Heritage Site (PR#390 p2), and as the first new mine development in the Dehcho Region in decades (PR#432 Day 2 p150, 155, 160), it is our view that the REA should have set out measures to ensure that the mitigation of impacts to water quality was mandatory and that regulators would be required to include these mitigations in any licences and permits granted for the development.

The Majority report does not identify any legal precedent which would support their conclusion that including the Developer's commitments to increased water storage capacity or to enhanced water treatment options as part of the scope of development provides the necessary certainty that these important mitigation measures will actually be undertaken. In our view, the appropriate approach to this Report of Environmental Assessment would have been to ensure that this mitigation was carried out through a decision based on section 128(1)(b)(ii) of the *Mackenzie Valley Resource Management Act* (MVRMA) and the imposition of mandatory measures. We expand on our reasons for this conclusion below.

Environmental Assessment

We have come to a different conclusion than the Majority because we place more weight on the views expressed by community members in Nahanni Butte and on those expressed by the Grand Chief of the Dehcho First Nations. Likewise, we have been convinced by Aboriginal Affairs and Northern Development Canada (AANDC) and Parks Canada, the agencies with extensive expertise in matters of water quality and with the specific knowledge of the park that it is essential that the highest level of protection be provided to the integrity of the aquatic ecosystem of the park. In our view, this is a situation where the precautionary principle should have been applied.

The evidence set out by the Nahanni Butte Dene Band and community members in the Review Board's June 22, 2011 hearing in the community was clear. The Band was willing to compromise and supported the development of the Prairie Creek mine, welcoming the benefits it would bring, as long as their traditional and cultural pursuits and areas were

protected (PR#432 Day 2 p147-155). Several speakers reinforced the importance of protecting the water flowing into the Nahanni National Park Reserve and, ultimately, right past the community, as one of the minimum conditions for their acceptance of this development (PR#432 Day1 p94-96, Day2 p149-162), .

This balanced approach we also reflected in the presentation of the Grand Chief of the Dehcho First Nations, Sam Gargan on June 23, 2011. The Grand Chief, however, also emphasized the need to protect water and the fish and wildlife that depend on it as a basic requirement for approval of the Canadian Zinc development:

> *(I)f I'm sitting here I represent ten Communities. I represent about five thousand people. Animals and creatures are on the land, and wildlife... we're also responsible for that. Whatever swims and lives in the water we also have to take care of. And the land -- the land we have to take care of, that's before us." (PR#432 Day 2, p155-156)*
>
> *However, the main issue that we have here today is with regard to the value of the Nahanni Park expansion and what it represents in the world community. This is a pristine area to which a little mine's going to be built, a mine that can still have an impact on the quality of our water, the fish living in our water, and the wildlife that lives around that area.(PR#432 Day 2, p156)*

After the completion of the public hearings, efforts were made by the parties to achieve a compromise on the best approach to protecting the water quality of Prairie Creek downstream of the proposed mine and within Nahanni National Park Reserve. This process is described in the Majority report (see section 2.2.6 above). In the end, a consensus was not achieved.

The matters addressed were highly technical. In respect of water quality, the final submissions of AANDC, supported by Parks Canada and extensive expert evidence, recommended that the water quality objectives for the Prairie Creek mine site (called site specific water quality objectives) should be developed using the most protective approach available, the Reference Condition Approach. Development of site specific water quality objectives using the Reference Condition Approach would, in their opinion, ensure that the ecological integrity of the aquatic ecosystem in the Park was, to the extent possible unchanged, while still permitting the development to proceed (PR#466 p6-9, PR#464 p10-11). Related to the developer's ability to meet effluent quality criteria based on this approach is the need for additional water storage capacity at the site and to ensure that no paste backfill tailing be stored on site and in the waste rock piles and that none would remain on surface when mining is completed.

Canadian Zinc Corp. argued that not all water quality parameters set out as effluent quality criteria should have to be set using the Reference Condition Approach. It made commitments to either additional water storage or to water treatment, if required, to meet discharge limits and it made additional commitments related to the handling of paste

backfill. Clearly the Developer argued that in some respects, a reduced standard could be applied and the environment would still be protected. (PR#469 p2-4)

The difference between our opinion and that of the Majority is primarily that we consider the protection of downstream water quality to be of the utmost importance. We believe that it remains unclear exactly what the developer will do to protect water quality. We do not suggest that they are not committed to preventing these impacts but in our view it remains less than clear exactly what their final mitigation measures will be. It is also clear to us that the developer wants the effluent quality criteria for at least some parameters to be less stringent. In this case, and because of these uncertainties we find ourselves unable to conclude, as the Majority has, that all significant impacts will be mitigated and are therefore unlikely.

Significance finding

The following are our reasons for finding that the proposed Prairie Creek mine will result in significant impacts on the water quality of Prairie Creek.

It is clear from the record that the proposed mine is:

- Upstream of Nahanni National Park Reserve, a protected area of national significance and a World Heritage Site of international significance.
- Upstream of Dehcho communities, most importantly, Nahanni Butte.
- Upstream of a traditional fishery.
- Located on a virtually pristine creek which flows directly thereafter into Nahanni National Park Reserve
- Supported by Dehcho First Nations and Nahanni Butte leaders, as long a certain conditions are met. The leaders told the Review Board the water had to be managed to the highest standard possible. They and their children will be drinking the water downstream of the mine.

In the Review Board's hearings, community members and leadership reminded us that this project must be undertaken responsibly and in an environmentally sustainable manner. Their concerns, in our opinion, should carry great weight because they will be the most impacted communities. The quality of the water in Prairie Creek is important to the people downstream, to the nation and to the world.

We believe that the setting for this mine requires a much higher standard of care than would be required in many other places. The threshold for acceptable environmental change is much higher in such a place as it is entirely surrounded by a National Park. An impact that might not matter as much in a more disturbed, less important setting is significant in such a location.

Because of the sensitivity of the setting and the importance placed by Aboriginal parties on water quality, we conclude that a precautionary approach is necessary for this mine.

In our view, based on the priorities expressed by First Nations and the concerns, technical predictions and argument submitted by AANDC, any impacts or change in water quality in this setting would be significant. The evidence available does not convince us that the ecological integrity of the aquatic ecosystem of Nahanni National Park Reserve will not be affected by this development. The developer bears the burden of proving that its project will not cause significant environmental impacts. In our view it has not done so in respect of water quality.

Likewise, the evidence indicates the possibility of contamination arising from fugitive dust during the transport of concentrated product from the mine (PR#386 p18-21). This contamination will affect the land and waters along the haul route inside and outside of the National Park. Any contamination of the National Park is, in our view, also an impact of significance particularly in relation to water bodies and streams.

Thus, based on our review of the evidence in this proceeding, we conclude that this project is likely to cause an overall significant adverse impact on water quality.

In our opinion, responsible environmental and sustainable management requires the following measures be applied to the development of the Canadian Zinc mine:

1. The Developer must apply the highest standards for setting water quality objectives. In this case, Canadian Zinc must be required to use the Reference Condition Approach specified by AANDC to ensure that contaminants in the effluent that it discharges to Prairie Creek do not exceed natural background levels. This will prevent significant adverse impacts on water quality. The CCME standards are not protective enough to prevent impacts on Prairie Creek in our view. The hybrid approach proposed by the developer is not protective enough either.
2. The developer must implement the best available water treatment for this development during construction, operation and closure and reclamation.
3. The additional water storage area helps deals with many risks to water quality. The developer must be required to build this second area.
4. When the regulators set reclamation security deposit requirements for this mine, they should apply the precautionary approach. It is essential that the potentially high costs of accidents and malfunctions in this remote and special setting, as well as the uncertainty of achieving 100 percent storage of paste backfill underground be factored into the setting of security.
5. The precautionary approach is also applicable to impacts from the proposed haul road in Nahanni National Park Reserve. There is an unacceptable potential risk of significant adverse impacts from fugitive emissions of toxic concentrate dust which may affect both the land and water inside the National Park. Secondary containment of concentrate in transit along the haul road must be required.

In our view, the commitments made by Canadian Zinc Corp. are an essential part of the project. They are important in terms of water quality and other issues. But these commitments are only as good as our certainty that they will be undertaken and will be effective. Some are not clear. We have concluded that the more important of these commitments must be included in legally binding measures instead of suggestions. This will require regulators to build those commitments into any permits and licenses they issue to the full extent they can. As licence or permit conditions such commitments will be subject both to monitoring and enforcement, ensuring that Canadian Zinc does what it says it will.

We also suggest that regulators apply the highest standard of care within their discretion to the development of the terms and conditions for any permits and licenses granted for this development.

In conclusion, we are of the opinion that the suggestions contained in the Majority report are not protective enough for this project given its location. We believe that the proposed development is likely to cause significant adverse impacts to water quality, and that all the suggestions in the Review Board's report should be measures.

The First Nations and people directly affected by this development have made it clear that they are not opposed to the Prairie Creek mine, provided that it is developed and managed to a high standard of environmental responsibility. Project approval in this case should give the people what they have asked for: This project needs to be done right. In this case, that means using the precautionary approach described above, with the measures set out as binding requirements.

Submitted by,

Danny Bayha
Board Member

Rachel Crapeau
Board Member

Appendix A: Summary of suggestions

Suggestion #1

The Review Board believes that either option proposed by Canadian Zinc Corp. to increase water storage on site will improve water quality in Prairie Creek. The Review Board notes that construction of a second pond may address a broader range of risks and result in better water management on site and improved water quality in Prairie Creek. The Review Board suggests that the Mackenzie Valley Land and Water Board consider this during the licensing phase.

Suggestion #2

The Review Board suggests that Canadian Zinc Corp. prepare a Tailings Management Plan for both the permanent storage of tailings underground and the temporary storage of tailings on surface at the mine site. The Review Board suggests that this Plan should be part of the water license.

Suggestion #3

The Review Board recognizes that there are better ways to contain concentrate during transport along the winter road than the bag method proposed by the developer. The Review Board suggests that the developer use secondary containment of concentrate during transport along the winter access road to reduce the risk of contaminant dispersal. The Mackenzie Valley Land and Water Board and Parks Canada can best address this during the regulatory phase.

Appendix B: List of developer's commitments

From Canadian Zinc Corp. Final Commitments Table (PR#470, Table 1)

Commitment	Source
Consultation	
Continue to engage First Nations throughout the EA process.	DAR, section 7.2
Operate and participate in a Technical Advisory Committee (TAC) which will meet in the region three times annually to review and discuss mine operations and monitoring results, and other issues of mutual interest in the region.	DAR, section 7.3
Welcome NBDB, LKFN, other First Nation, and Government representation on the TAC.	Reply to IR2, Appendix J.
Appropriate collaborative monitoring initiatives with First Nations, Parks Canada and other regulatory agencies will be supported.	DAR, section 10.7.1
The Nahanni Butte community information representative position will be continued during operations.	DAR, section 11.3
Culture	
If possible heritage/cultural resources are found, they will be preserved and the authorities notified.	DAR, section 11.2
Deter and monitor un-authorized use of the access road and hunting.	DAR, sections 9.4.1 and 11.4
Employ an NBDB member as an environmental monitor.	Impact Benefits Agreement between NBDB and CZN, Jan. 20, 2011 (confidential).
Involve NBDB members in spill response training and inform the Band of any spills.	NBDB-CZN Meeting Report, June 10, 2010.
CZN will conduct a supplementary Archaeological Impact Assessment for the proposed road re-alignment from the Liard River near Nahanni Butte to Grainger Gap. The survey will occur after the road alignment has been confirmed more accurately.	Reply to IR GNWT6
Socio-economics	
Impact Benefit Agreements will be negotiated with the Nahanni Butte Dene Band and the LiidliiKue First Nation.	DAR, Appendix 19
Negotiate a Socio-Economic Agreement with the GNWT.	Technical Meeting, Oct. 6, 2010

Commitment	Source
A hire-first policy for qualified local (Nahanni Butte) residents, then Dehcho residents, then northern residents will be adopted.	DAR, section 11.1
Services and supplies will be sourced locally and across the north, provided these are competitive.	DAR, section 11.1
Employment of Dehcho residents and social impacts will be monitored via annual IBA reports, and details of mine employment, training and contracts given out will be provided. Such reports will also be the basis for reporting to regulators.	DAR, section 11.3
Employees will be offered a variety of mine related training courses, including skills training in their area of employment and in safety. The Mine scholarship program will continue.	DAR, Appendix 19
The Mine will work with communities and its leaders to develop and implement strategies to limit negative health outcomes, such as drug and alcohol abuse.	DAR, Appendix 19
The Mine will continue to be active in Study Area communities through sponsorship programs that will improve life for communities and those not benefiting from the Project directly.	DAR, Appendix 19
Applicants for work at the mine will be notified that should they be Employed, they will have to make appropriate arrangements for child care in their absence.	Reply to IR GNWT7
Contractors and subcontractors will be required to sign an Employment Contract and Code of Conduct regarding adhering to policies such as northern Employment criteria, which will be part of selection evaluation criteria. Information on Potential employees will be passed on to contractors, and Study Area communities will be notified of construction and hiring timelines.	Reply to IR GNWT8
The Mine's socio-economic Adaptive Management System will consist of: a Monitoring System consisting principally of a year-long process of collecting and analysing data and trends regarding the outcomes from participation in the Project and more general socio-economic progress of the Study Area; and, a Response System consisting of a formal session to communicate results and receive input from representatives of the affected communities on areas where changes could improve outcomes and productivity.	Reply to IR GNWT10
After fulfilling obligations to IBA's and the Nahendeh Aboriginal Economic Council, the Mine will advertise its needs in regional newspapers and continue participation in regional NWT trade shows to communicate the opportunities associated with the project. A database of NWT qualified businesses related to various services and supplies will be maintained.	Reply to IR GNWT13

Commitment	Source
An annual operations report will be produced to provide the public with information regarding the production schedule at the Prairie Creek Mine, its employment record, and planned activities for the upcoming year. This report will inform Study Area, Dehcho and NWT residents and regulators, and will include information on employment and business procurement.	Reply to IR GNWT15
CZN will identify jobs for which formal entry level educational requirements will be adjusted for Dene job applicants. For greater certainly,[sic] but subject to applicable law, CZN commits to requiring Dene to have a minimum Grade 10 for all entry level positions at the project, and will, from time to time, adjust formal entry level educational requirements for vacant positions in order to improve the acceptability of potential Inuit job applicants for these positions. Appendix 30,	Appendix A Socio-economic Commitments, B(9) page 15 , DAR
Where appropriate, CZN will consider ability, skills and experience as an equivalent to formal qualifications as identified in job descriptions. Appendix 30, Appendix	A Socio-economic Commitments, B(4) page 15, DAR
Dene employees will not be disciplined or terminated due to their inability to speak the English language, but may be transferred to a job requiring less knowledge of the English language or to a training program to suit them to another job. Such transfer will be at the discretion of CZN.	Appendix 30, Appendix A Socio-economic Commitments, B(11) p 16, DAR
Dene who do not possess knowledge of the English language, either written or verbal, will be given reasonable opportunities to qualify for jobs where lack of knowledge of the English language does not compromise the safety of the employee, safety of others or job performance.	Appendix 30, Appendix A Socio-economic Commitments, B(10) p 16, DAR
CZN expects to provide several summer positions for various responsibilities. The areas of work could relate to general labourers, office assistance or help with annual events held in neighboring communities. These annual positions could be posted at the mine site, regional CZN offices, and advertised in local newspapers. Priority will be given to relatives of mine staff from the IBA communities.	Reply to IR GNWT 1-9 Q4
CZN will encourage and provide opportunities for advancement and promotion to employees	Appendix 30, Section 2 p 5, DAR
CZN will ensure that its internal posting system for hiring personnel for the project will include posting at the project and in Nahanni Butte.	Appendix30, appendix A Socio-economic Commitments, B(5) page 15, DAR

Commitment	Source
CZN will develop recruitment and hiring policies and procedures that will encourage Dene employment at the project	Appendix 30, Appendix A Socio-economic Commitments, B(3) page15, DAR
It is the goal of Canadian Zinc's to enhance positive benefits and eliminate or at least reduce the impacts of negative effects. It will do this through a combination of its "hire first" program, offering a comprehensive benefits package to employees, making the Prairie Creek Mine site hospitable through numerous activities, programs and services, employ a community information representative to help with communications between employees and mine management, and to remain active participants in Study Area community events.	Appendix 19, Section 7.7.3.4, DAR
The focus is primarily on the participation of labour and business from the Study Area communities. However, opportunities will exist for any resident or business in the NWT	Appendix 19, Section 7.3, DAR
Once CZN has fulfilled its commitments with its IBA holders, the company will promote the direct employment of NWT residents outside the Study Area promoting available employment positions with advertising in regional newspapers, and postings with NWT employment agencies. Some of these agencies would include MTS and the employment coordinators with various First Nation Bands in NWT. The company will consider a pick-up point in Yellowknife if employee numbers warrant it and it is economically justified.	Reply to IR GNWT 1-9 Q1.
Much of the participation during construction will be local. This is particularly true for employment.	Appendix 19, Section 7.3.1.3, DAR
…CZN has undertaken to employ NBDB members as environmental monitors at the mine and for the access road. CZN is also looking to NBDB members first for the operation of checkpoints on the road to manage traffic and the possible use of the road by individuals not on mine business.	Reply to IR GNWT 1-12 Q2
CZN expects to follow the hiring preferences negotiated with its IBA holders. The order of priority CZN has been using for hiring applicants with similar qualifications can be defined as: 1. Members of the Nahanni Butte Dene Band 2. Members of the LiidliiKue First Nation Band 3. Dene descendants within the Dehcho Region 4. Residence within the Northwest Territories 5. Others.	Reply to GNWT IR 1-8 Q1

Commitment	Source
As part of our responsibility to the Northwest Territory [sic], we are strongly committed to employing and training people who are native to this area and/or are permanent residents. To achieve this, travel assistance will be provided for employees traveling from designated points of hire.	Appendix 30, Section 6, DAR
Should circumstances change in such a manner that different rotation schedules become more feasible, such options will be discussed with the mine's workforce.	Appendix 19, Section 7.7.3.3, DAR
Work rotations at the Prairie Creek operation are based on three week turnarounds (i.e., three weeks working followed by three weeks off).	Appendix 30, Section 3.2 p 6, DAR
Personnel that are not area residents will be flown-in to site on charter flights originating from 1 or 2 locations, such as Fort Nelson, Edmonton, Yellowknife or Vancouver. Employees will make their own way to these locations for pick-up. Personnel from local communities will be flown in on charter flights from Nahanni Butte, Fort Liard or Fort Simpson. NWT residents beyond these communities will make their own travel arrangements to these pick-up points.	Main Report, Section 6.26 page 247, DAR
CZN will be making commitments to apprentice positions with its IBA holders. The company expects to have several apprentice positions available with the project although priority will be given to CZN's IBA holders.	Response to IR GNWT 1-9 Q3
CZN will employ Dene apprentices, if available and if there are qualified tradesmen on site to supervise an apprentice.	Appendix 30, Appendix A Socio-economic Commitments, C(4) page 16, DAR
CZN will also endeavor to carry out relevant training programs that are offered through cooperation with other agencies in the Territory to support regional education and build up a further educated Territorial workforce.	Appendix 30, Section 2 page 5, DAR

Commitment	Source
For the Study Area community as a whole, regarding additional investments in education, CZN will: • Sponsor students attending higher education through a scholarship program. • Work with the NWT Mine Training Society and Aurora College to provide education and training opportunities. • Work with Study Area schools to provide details of its operations, its future labour and supply needs, and opportunities for students. • Work with Study Area communities and businesses to improve participation and productivity. • Remain very active in the communities through investments, sponsorships, promotions, and attendance at community events.	Responses to IR GNWT 1-11 Q1
CZN wishes to provide opportunities for participation by Dene in the development of the project, and that to do so training will be required to position Dene to take advantage of business and employment opportunities associated with the project.	Appendix 30, Appendix A Socio-economic Commitments, C(1) page 16, DAR
Through its Impact and Benefit Agreement holders and the Deh Cho First Nation, CZN is looking to invest in education and training specific to the needs identified by the Dehcho residents. Emphasis is on skills that are applicable to many job descriptions and not necessarily specific to mining.	Response to IR GNWT 1-11 Q1
Canadian Zinc will promote higher learning through a scholarship program, sponsor training in conjunction with the mine training society, take an active role in the schools and communities, and sponsor visits by school staff to site to help them understand better the environment and the possibilities for their students.	Appendix 19, Section 11.3, Table 11-1, DAR
Where an employee is required to have specific skills to operate equipment in the course of their duties, training will be provided.	Appendix 30, Section 2, DAR
The company is also committed to providing mentoring programs at the mine, ongoing school workshop presentations at local schools, and annual scholarships to promote the abilities of future generations within the Dehcho Region.	Response to IR GNWT 1-9 Q2

Commitment	Source
A general overview of CZN's Aboriginal and NWT procurement strategy is outlined below. CZN will focus on a general Northern procurement policy by adhering to the following principals: i. Wherever practical, construction projects will be split into phases or segments so that small northern contractors and suppliers can have the opportunity to bid. 11. Wherever practical, goods contracts will be tendered by grouping so that northern contractors and suppliers have the opportunity to bid and compete. iii. Whenever practical, contracts for the supply of goods will be tendered in a manner which provides opportunities for northern contractors or suppliers.	Response to IR GNWT 1-13 Q7
Canadian Zinc is committed to working with the community and business leaders to maximize the benefits from the Project. As a part of this commitment, Canadian Zinc will offer valuable guidance in areas where it has particular expertise such as management, industrial development, and organisation.	Appendix 19, Section 7.7.2, DAR

Commitment	Source
Business" means a business owned by one or more of the Participating First Nations, directly or through their respective development corporations, or a Member or Members of the Participating First Nations. The Aboriginal Business must comply with all the legal requirements to carry on business in the Dehcho region and must be certified by the relevant Participating First Nations and meet one of the following criteria: i. Is a corporation or limited company with at least 51 percent of the company's voting shares beneficially owned by a Participating First Nation, a Participating First Nation development limited partnership or a Participating First Nation Member or Members; ii. Is a cooperative with at least 51 percent of the cooperative's voting shares beneficially owned by one or more Participating First Nations, a Participating First Nation development limited partnership or Participating First Nation Members; iii. Is a sole proprietorship, the proprietor of which is or is owned by one or more of the Participating First Nations, Participating First Nations development limited partnership or Participating First Nations Members; or, iv. Is a partnership, the majority interest in which is owned by one or more of the Participating First Nations, Participating First Nations development limited partnership or Participating First Nations Members, or in which the majority of benefits under the partnership agreement accrue to the Participating First Nations or Participating First Nations Member(s).	Response to IR GNWT 1-15 Q2
CZN will endeavour to contract a bulk fuel service company located in the region, preferably close to the haul route, which has an established mobile spill response unit that would be available 24 hours a day.	Response to IR Parks Canada 2-9, Appendix I page 3
It is CZN's intent to provide IBA holders advance notice on all contracts and procurement opportunities. The specific timeframes are still in IBA negotiation. Further to this commitment, CZN expects to advertise sourcing needs in local and regional newspapers in the NWT, and notify local businesses of the project's requirements.	Response to IR GNWT 1-13 Q3
The focus is primarily on the participation of labour and business from the Study Area communities however opportunities will exist for any resident or business in the NWT.	Appendix 19, Section 7.3, DAR

Commitment	Source
CZN recognizes that businesses which maximize Dene content should, consistent with the terms of this schedule, be given preference in the provision of commercial services for the project.	Appendix 30, Appendix A Socio-economic Commitments, D(2) page 16, DAR
CZN will apply its local and NWT procurement policies during the reclamation phase.	Response to IR GNWT 1-13 Q5
… Canadian Zinc will discuss the importance of local hires with Aboriginal development corporations during and after IBA negotiations and make northern employment a criterion for evaluating proposals.	Appendix 19, Section 11.3, Table 11-1, DAR
CZN will emphasize local procurement by its contractors and will make this a valued component in how bids are evaluated. Businesses outside the Study Area will be encouraged to participate, and CZN will extend to them the same opportunities given to Study Area businesses should those companies be unable to fill certain contracts. CZN would prefer to offer contracts to NWT-based companies that can provide goods and services at a competitive price and meet local sub-contracting criteria.	Response to IR GNWT 1-13 Q4
In order to ensure that its contractors and subcontractors honour and adhere to all commitments made, CZN will ensure, through written contracts, that all such parties are aware and comply with all of the terms and conditions that are associated with such permits that are necessary for operating the Mine.	Main Report, section 2.2 page P.61, DAR
Much of the construction activities will be completed by contractors. These contractors will be encouraged to hire from within the Study Area communities. To facilitate this local participation, Canadian Zinc will • notify the Study Area communities of the construction schedule in advance of the activities, • set out a schedule of when the contractors will be hiring, • provide the names of past employees to the contractors, • provide the names of contractors and their contact information to the communities, and • pass applications from local labour to contractors.	Appendix 19, Section 7.3.1.1, DAR
To improve the efficiency of CZN's employment policy, the company will coordinate information of potential employees to contractors, notify Study Area communities of construction timelines and timelines for hiring, and pass along applications from local workers to contractors.	Response to IR GNWT 1-8 Q2

Commitment	Source
As part of their ongoing employment, all employees will take part in cross-cultural training to assist with the development of positive working relationships at the mine.	Appendix 30, Section 2.2, DAR
As the project progresses, work will be required to study if and how the transfer of wealth is taking place.	Appendix 19, Section 7.7.5.1, DAR
Where necessary, as determined by CZN, signs, safety, regulations and job advertisements shall be translated.	Appendix 30, Appendix A Socio-economic Commitments, B(12) p 16, DAR
…regardless of their family situation, Canadian Zinc employees will have access to a comprehensive human resources package that includes programs to help reduce the negative aspects of rotational work. Camp life will include recreational activities, religious services, and access to the Internet. The camp itself is being designed such that each employee will have their own room. Programs will be offered throughout the year such as personal financial planning and those associated with seasonal and religious holidays. Counseling services will be available as a part of the overall employee compensation package. In addition, traditional Aboriginal events and activities will be planned and country foods will be served when available.	Appendix 19, Section 7.7.3.1, DAR
Canadian Zinc will continue to be active in the Study Area communities through sponsorship programs that will improve community life and that [sic]for those not benefiting from the Project directly.	Appendix 19, Section 11.3, Table 11-1, DAR
Canadian Zinc will have guidelines that outline the circumstances under which employees can return home prior to the completion of their rotation. The company will also have a leniency policy for new employees that will outline the circumstances under which workers need some time to adjust to work life and camp life. Canadian Zinc will also sponsor community events that help improve the quality of life for those not participating directing [sic] in mine employment and those who are on their three-weeks off.	Appendix 19, Section 7.7.3.1, DAR
CZN will provide an option for all its employees to participate in a comprehensive benefits plan coverage, which includes dental, medical, AD&D, life insurance (both short- and long-term disability coverage), as well as an employee assistance program.	Appendix 30, Section 4, DAR

Commitment	Source
CZN will provide at its cost regular but limited opportunities for Dene employees to communicate with immediate family in their home communities using satellite or other phone systems.	Appendix 30, Appendix A Socio-economic Commitments, E(2) page 17, DAR
Every employee will be encouraged to participate in supplementary orientation seminars upon arrival at the site for the first time. Seminars will include, but may not be limited to, guidance on personal financial management, and review of employee benefits packages.	Appendix 19, Section 7.7.2, DAR
Canadian Zinc is committed to working closely with its employees, their families and communities to find solutions to challenges as they occur. The community information representative will be responsible for assisting employees and Canadian Zinc management communicate [sic]with one another when issues arise.	Appendix 19, Section 7.7.3, DAR
Life skills training will be made available on an as need [sic]basis through the Training Department. Life skills training programs provide employee assistance in coping with new situations from camp life, long distance commuting to basic financial planning that is needed as a result of increased income.	Appendix 30, Section 2.3, DAR
The employment assistance program (EAP) is designed to assist employees and their immediate family members with problems that may affect their well-being and/or their ability to perform their jobs. The EAP will be operated by a third-party professional counseling service (accessible in the first instance by phone) and services will be available to the CZN employees and their immediate family (spouse, partner and dependents).	Appendix 30, Section 4.1, DAR
The Human Resources Management Plan outlines the details related to alcohol and drug usage during an employee's time at Prairie Creek. In addition, the company will engage with the Study Area communities and encourage cooperation with government and non-government officials on a strategy that might limit the severity of this impact and ensure these people receive the help they need.	Appendix 19, Section 7.7.4.1, DAR

Commitment	Source
The on-site measures CZN would pursue to protect workers from the spread of communicable diseases include the following: • Having trained medical personnel to identify communicable diseases • Providing advice regarding personal hygiene. • Designating potential areas to isolate infected workers if required • Pre-screening employment candidates with medical check-ups • Requesting employees to be up-to-date with their vaccinations • Post the contact number for the Chief of Public Health • Discuss possible outbreaks of STIs at Health & Safety meetings • Provide educational materials in the project's library	Response to IR GNWT 1-7 Q3
Highlighting CZN's Adaptive Management System will be: • A Monitoring System consisting principally of a year-long process of collecting and analysing data and trends regarding the outcomes from participation in the Project and more general socio-economic progress of the Study Area. • A Response System consisting of a formal session to communicate results and receive input from representatives of the affected communities on areas where changes could improve outcomes and productivity.	Response to IR GNWT 1-10 Q1
CZN has committed to altering its programs where possible when existing ones are ineffective or problematic.	Response to IR GNWT 1-10 Q1
Canadian Zinc is committed to monitoring and reporting the socio-economic progress of the Study Area communities during the operation of its mine.	Appendix 19, Section 7.7.5.1, DAR
The annual report will include information on the socio-economic performance of the Study Area. These data will be gathered from secondary sources, including the NWT Bureau of Statistics and Statistics Canada. This information will be combined with knowledge gathered by company officials including community information officers working in the Study Area and communicating with active employees, their families, and other community members to determine the overall socio-economic changes taking place.	Response to IR GNWT 1-15 Q1

Commitment	Source
The Company will generate an annual report on production, employment, procurement and socio-economic trends. It will be the principal communication tool that informs the public of the results from the Company's monitoring system. This monitoring includes information gathered from employees and their communities by the community information officers. Other company officials will remain active in the communities through their participation in sponsorships, promotions and investments. Information gathered "on-the-ground" will be combined with the technical approach used in gathering and reporting operations' data and socio-economic statistics.	Response to IR GNWT 1-10 Q1 pages 29-30
CZN will produce an annual report on its operations. It will provide the public with information regarding the production schedule at the Prairie Creek Mine, its employment record, and planned activities for the upcoming year. This report will serve as CZN's submission to inform Study Area, Deh Cho and NWT residents and regulators. The report will include information on employment and business procurement. The statistics reported will include: • total workforce, new hires, terminations, and total labour income, • training programs, number of participants, and apprenticeships, • gross value of operation expenditures, a list of procurement contracts, and participating Aboriginal and NWT businesses, • road access—the details of this information such as volume of commercial and non-commercial traffic depends on the final decision regarding road ownership and public access, • community activities, investments and sponsorships, and • a schedule of upcoming procurement opportunities and operational expenditures.	Response to IR GNWT 1-15 Q1

Commitment	Source
[As noted in Table 9-1, The CZN Monitoring and Management System includes: • Impact and Benefit Agreement Reporting: Detailed reporting to communities with Impact and Benefit Agreements. The contents of thesereports are subject to ongoing negotiations. • Employment Reporting: Annual reporting on total workforce, new hires, terminations, length of employment, labour income. • Procurement Reporting: Annual reporting on total expenditures for goods and services, list of goods and services required, upcoming requirements, total spending on First Nation businesses and NWT businesses. • Communication Strategy: Working with the communities through the IBA negotiations, establish a communication strategy with each community. • Annual Socio-Economic Report: Detailed report on mining activities, and the economic, social, cultural and socio-economic performance on the Study area.	Appendix 19, Section 9, Table 9-1, DAR
• Where the disclosure of information does not compromise confidentiality, data will be separated by ethnicity and geography; that is, Aboriginal versus non-Aboriginal, and Study Area communities versus the rest of the NWT and non-NWT. CZN will include all Status, non-Status, Métis, and Inuit as Aboriginal for the purpose of reporting ethnicity. NWT Residency will be defined as living in the territory.	Response to IR GNWT 1-15 Q3
Education relating to commodity prices, market fluctuations, supply/demand and operational costs will be made available to the public.	Response to IR GNWT 1-11 Q1
Significant monitoring of operations and the environment will occur during and after the Mine's life. CZN expects individuals from local communities to be involved in this, preferably as employees. CZN undertakes to share the monitoring results.	Main Report, Executive Summary page 23, DAR
Fish	
Any habitat losses will be replaced to the satisfaction of Fisheries and Oceans Canada (DFO).	DAR, section 10.2.4

Commitment	Source
DFO's Operational Statements for creek crossings, including span structures and ice bridges/snow-fills, will be adopted. Physical footprints will not be introduced within the high water mark of crossings, other than snow and ice.	DAR, section 10.2.4, and reply to IR2 DFO 2-5.
Disturbance of stream banks and riparian areas at stream crossings will be minimized. Stream banks will be protected as necessary, with the possible use of ice and/or matting. A stable road bed will be constructed adjacent to creeks and runoff control will be provided. Re-vegetation of riparian areas will be promoted.	DAR, sections 9.3.2 and 10.2.4
Temporary crossing structures and snow-fills will be removed at break-up.	DAR, section 10.2.4
Best management practice sediment controls will be adopted at the Mine and along the access road.	DAR, section 10.2.5
A sediment and erosion control plan will be developed for construction and operation of the access road as a condition of a new road LUP.	Technical Meeting, Day 2, Oct. 7, 2010
The 'DFO Protocol for Winter Water Withdrawal from Ice-Covered Water bodies in the NWT' will be adopted for water supply from lakes for road construction. Appropriate data will be provided to DFO for approval before extraction occurs. Assessment data for creeks will be collected and DFO consulted for approval before extracting water from creeks. Expected water sources are the Mine well, Mosquito Lake and the Liard River. A short spur road to Mosquito Lake already exists and will be utilized. Other lakes will be quantified and water extracted based on the protocol. The main water use is expected to be for road bed construction. Creek crossings will be primarily by snow-fill. Clear span structures will be considered if conditions vary from those expected.	Reply to IR2 DFO 2-4.
Disruption of the only known spawning location in the area (bull trout in Funeral Creek) during the spawning period (mid-August) will be avoided.	DAR, section 10.2.4
The site policy of no fishing and any other unnecessary disturbance of the aquatic environment will be continued.	DAR, section 10.2.4
Sources of aggregate will not be situated in river beds or within the high water mark of alluvial fans. No additional access roads and/or crossings will be required to access aggregate sources.	Reply to IR DFO2, and IR2 DFO 2-2.
To reclaim the Funeral Creek road after Mine closure, coarse material or organic material will be placed adjacent to the creek to prevent sediment discharge until vegetation has established. Any channels flowing over the re-contoured road area will be armoured. Silt fence will be used where necessary to control sediment immediately after re-contouring. Materials will be placed on the road bed and not the bed of Funeral Creek.	Reply to IR DFO9

Commitment	Source
For exfiltration trench construction, measures for isolation of the work area and protection of the creek will be further developed after a positive EA outcome and during detailed design, to the satisfaction of DFO. A construction water management plan and spill contingency plan would also be developed.	Reply to IR2 DFO 2-3.
A detailed habitat assessment of the proposed location of the exfiltration trench will be conducted in 2011. Design modifications and/or the incorporation of additional elements will be considered as part of detailed design to avoid habitat loss. If it is determined that habitat loss is unavoidable, a suitable habitat compensation plan will be developed, also during detailed design.	Reply to IR2 DFO 2-3.
On mine closure, the approach to decommissioning of the exfiltration trench will be determined in consultation with DFO.	Reply to IR2 DFO 2-3.
Wildlife: *Wildlife Mitigation and Monitoring and Flight Impact Management Plans*	
The draft Wildlife Mitigation and Monitoring Plan (WMMP) will be updated during the permitting process. The plan will be considered a 'living' document, and further changes will be considered as necessary during operations, such changes being considered and discussed in the forum of the Technical Advisory Committee.	Reply to IR2 EC 2-3.
For caribou, wood bison, grizzly bear, wolverine, peregrine falcon, short-eared owl, horned grebe, rusty blackbird, olive-sided flycatcher, and common nighthawk, any mortality directly relating to the operation of the mine site or access road will trigger a review of mitigation strategies.	Reply to IR2, Appendix K.
The Nahanni Butte Dene Band will be consulted in the development of a wildlife management plan.	Technical Meeting, Day 2, Oct. 7, 2010
CZN welcomes NBDB, LKFN, other First Nation and Government representation on the Technical Advisory Committee (TAC).	Reply to IR2, Appendix J.
Wildlife: *Flight Impact Management Plan*	
The Flight Impact Management Plan will be reviewed and updated.	DAR, section 10.3
Flight paths to and from the mine will be considered according to the recommended guidelines for flying in caribou and sheep country, where feasible and within topographic and safety constraints.	Reply to IR2, Appendix K.
Wildlife: *Sighting /Monitoring / Reporting*	
Wildlife sightings in proximity to the Mine site and access road will be recorded in a wildlife sightings log, including location, numbers observed and reactions.	DAR, section 10.3
Dead wildlife encountered in proximity to the mine site and access road will be recorded and geo-referenced	Reply to IR2, Appendix K.

Commitment	Source
A Dall's sheep monitoring program will be implemented to ensure that Project-related effects on sheep are minimized. A monitoring plan is described in the draft Wildlife Mitigation and Monitoring Plan, and this is considered to be a response to Undertaking 23 from the Oct. 7, 2010 Technical Meeting.	Reply to IR2, Appendix K.
Appropriate collaborative monitoring initiatives with First Nations, Parks Canada and other regulatory agencies will be supported.	CZN letter dated Sep. 14 & 16, 2011
All relevant observations of wildlife (particularly of Dall's sheep, caribou, grey wolf, wolverine and grizzly bear) will be reported to mine environmental staff.	Reply to IR2, Appendix K.
All vehicles will be equipped with two-way radios. Wildlife sightings along the access road will be geo-referenced and reported to road supervisors.	Reply to IR2, Appendix K.
A radio call-in procedure will be implemented so that observations of caribou along the access road can immediately be relayed to the Road Operations Supervisor.	Reply to IR2, Appendix K.
A procedure will be implemented so that caribou observations made by aircraft pilots during transport of crews and materials will be reported to the Wildlife Monitor.	Reply to IR2, Appendix K.
Wildlife monitors will conduct ground surveillance during the initial mine start up and production period.	Reply to IR2, Appendix K.
Wildlife Monitors will conduct ground-based surveys of the access road (during winter operation), mine infrastructure sites, and the airstrip to assess caribou presence and identify caribou aggregations in the Project area.	Reply to IR2, Appendix K.
Summer maintenance work on the all season road will be voluntarily restricted to the period July-September. Wildlife monitors will check for nesting birds before work commences.	Reply to IR2, Appendix K.
If a nesting bird is found on site and eggs are present, monitoring will be conducted and efforts will be made to avoid the area. Any raptor nesting activity observed within 1.5 km of the Project will be reported to GNWT ENR.	Reply to IR2, Appendix K.
Any raptor nesting activity observed within 1.5 km of the Project will be reported to GNWT-ENR and Parks Canada.	GNWT Technical Report.
Measures aimed at reducing the number of birds that use the water storage pond (WSP) will be implemented.	Reply to IR2, Appendix K.
Wildlife Monitors will contribute to a detailed quarterly report of wildlife observations and incidents that occurred during the monitoring period. Reports will be submitted to First Nations, GNWT ENR, Environment Canada and Parks Canada.	Reply to IR2, Appendix K.

Commitment	Source
Wildlife: *Bears*	
Guidelines found in the "Safety in Grizzly and Black Bear Country" document will be followed to prevent and mitigate bear-human interactions.	Reply to IR2, Appendix K.
The appropriate regulatory agencies (e.g., GNWT ENR and Parks Canada) will be informed of any incidents with problem bears or other wildlife prior to action, unless imminent worker safety is at risk.	Reply to IR2, Appendix K.
Bear use of habitats near mining infrastructure (e.g. spring foraging by bears in disturbed areas) will be documented.	Reply to IR2, Appendix K.
A warning system will be developed for site workers in connection with bear sightings, as well as a structure for reporting bear-human encounters.	DAR, section 10.3.1
Waste Handling	
An effective Waste Management Plan will be implemented, particularly as it relates to the disposal of food waste..	Reply to IR2, Appendix K
Site workers will be encouraged to eat only in designated areas. Workers will be made aware as part of site orientation when they start that food, food waste and wrappings are not to be left around the site or in buildings where un-controlled entry is possible.	Reply to IR2 PC2-7.
All food and garbage/waste will be stored in bear-proof areas or bear-proof containers, including at the transfer facilities.	Reply to IR2 PC2-7.
Food waste will be collected and incinerated on a daily basis.	Reply to IR2 PC2-7.
All chemicals and supplies will be stored in an enclosed warehouse structure. Small quantities will be transferred to their point of use (in the Mill or shops) as required.	Reply to IR2 PC2-7.
The transfer facilities will be closed, all fuel, waste and sewage removed, and free of all attractants outside of the haul season.	DAR, section 6.24.3 and Technical Meeting, Day 2
Safety and training	
On-site personnel will be educated on the applicable policies and practices contained in the Wildlife Mitigation and Monitoring Plan.	Reply to IR2, Appendix K.
The guidelines for responding to bear encounters (contained in the Health and Safety Plan) will be reviewed and updated.	DAR, section 10.3
On-site personnel will receive basic bear awareness and safety training, including information on bear behaviour, how to avoid bear encounters, and how to respond to bears in the case of an encounter. Site environmental officers will be tasked with overseeing the program in terms of enforcement and effectiveness.	Reply to IR2 PC2-7.
On-site personnel will be discouraged from using areas outside of immediate work sites.	Reply to IR2, Appendix K.

Commitment	Source
Hunting, trapping and harvesting by site employees and contractors will be prohibited.	DAR, section 11.2
Pets will be prohibited on site.	Reply to IR2, Appendix K.
Access Road	
Maximum traffic speeds for all sections of the access road will be implemented accounting for road grade, curvature, adjacent sensitivities and sight-lines. Lower maximum speeds may be posted in the vicinity of sensitive wildlife areas.	Reply to IR PC4
A signage system will be employed along the access road to inform vehicle operators of vehicle/wildlife conflict areas. Reply to IR2	Appendix K.
Vehicle operators will yield right-of-way to wildlife and will take all reasonable measures to avoid vehicle-wildlife incidents.	Reply to IR2, Appendix K.
When any SAR species is visible on the road, vehicle activity will cease until the animals have moved a safe distance away or are no longer visible. Reply to IR2,	Appendix K.
High snow banks along the access road will be avoided so that wildlife can avoid traffic. Failing this, lower snow banks will be left every 100 m to facilitate wildlife moving off the road surface	DAR, section 9.4.1 and 10.3
To reduce noise along the access road, the use of engine retarders will be discouraged.	Reply to IR2, Appendix K.
Salt will not be used on the road alignment.	Reply to IR PC4
Public and access	
Non-mine road traffic will be deterred from using the road by signage and operating a check-point and screening station near the south-eastern terminus of the access road, manned by representatives from the Nahanni Butte Dene Band. Reply to IR2,	Appendix K.
Unauthorized use of the access road, and evidence of land use such as hunting, fishing, camping, or firewood harvesting will be noted, deterred and reported.	Reply to IR2, Appendix K.
The south-eastern end of the access road will be blocked at specified locations after each hauling season with gates, berms, pits and/or boulders to discourage use.	Reply to IR2, Appendix K.
Non-mine vehicles, including all-terrain vehicles (ATVs) and snowmobiles will be prohibited on- site.	Reply to IR2, Appendix K.
Operations Management	
Existing Prairie Creek Mine buildings and structures were designed and constructed by Kilborn Engineering Ltd. to the National Building Code. All new facilities will be also.	IR reply, Appendix D.
During the detailed design phase, a deterministic hazard assessment (DHA) for the project site will be undertaken, including review of ground acceleration coefficients.	IR reply, Appendix D.

Commitment	Source
All personnel will receive appropriate training to ensure they are fully aware of health, safety and environmental policies and practices and able to perform tasks in compliance with established policies and legislation; and to ensure employees are fully aware and trained to respond to an emergency.	DAR, section 6.25
Aggregates for the Mine would be sourced from the on-site quarry and possibly other local sources. Any crushing required will occur set back from the creek with a buffer for runoff.	DAR, section 8.2.5
Explosives for Mine operations will be exclusively emulsions or sticks.	Reply to IR NRCan1
Reagents currently stored on the Reagent Storage Pad south of the Mine will be consumed during operations or taken off-site for disposal.	DAR, section 6.3.11.
Due care and precautions will be taken during the winter transfer of sulphuric acid from tankers to storage tanks.	DAR, section 8.2.4
All concentrates will be shipped in bags free of external concentrate dust. Any torn bags will be double-bagged, and any spillage cleaned-up completely.	DAR, section 6.24.3
Water for fire suppression will be taken from the water ring main.	DAR, section 6.3.15
Drummed hazardous waste will be collected in the Waste Transfer Area for off-site disposal by a registered carrier following all applicable regulations	DAR, section 6.14
Waste motor and lubricating oil will either be blended with diesel fuel or used for incinerator ignition.	DAR, section 6.14
Existing infrastructure will be surveyed for asbestos-containing material, and any such material found will be removed and landfilled within the Waste Rock Pile footprint.	DAR, section 6.14
A solid waste facility will be operated consisting of a solid waste landfill for inert material, a fenced sewage sludge landfill and a land farm for hydrocarbon contaminated soil.	DAR, sections 6.14 and 8.2.5
Heat traced pipe will carry process water and mine water to and from the Water Storage Pond. Lines will be inspected frequently, and will run along the access road and not next to Prairie Creek.	DAR, sections 6.3.15 and 8.8.4
A spill contingency plan for the Mine and access road will be reviewed and updated. The plan will include the transport, manufacture and use of explosives and components of explosives.	Reply to IR NRCan1 and IR2, Appendix I

Commitment	Source
Water treatment sludge will be combined with the backfill mix and taken underground, as will ash from the incinerator. In the unlikely event that monitoring and assessments during operations indicate that a period of water treatment needs to continue after mine closure, any sludge will be stabilized with cement and taken to a suitable disposal location. This might be a mine portal that has not been completely backfilled in order to accommodate the sludge, or part of the Waste Rock Pile before cover placement.	Reply to IR2 NRCan 2-6.
Annual geotechnical inspections of major structures (Water Storage Pond, Waste Rock Pile, Flood Protection Berm), and terrain in and around them, will be undertaken.	DAR, section 10.4.4
The Catchment Pond will be lined with a low permeability geo-membrane, and the existing culvert to Harrison Creek will be retained for emergency use only.	DAR, section 8.7.2
The Catchment Pond discharge mechanism will include pumps on stand-by which can be activated to ensure sufficient discharge. The outfall line will have a valve or gate which can be temporarily closed, if necessary. Discharge of treated water to Prairie Creek during winter will occur via a pipeline from the WTP connected to the outlet culvert in the Catchment Pond. The pond would be isolated from the line to avoid freezing effects. There will be a safety return line from the Catchment Pond to the Water Storage Pond with installed pumps. The outfall line will have a valve or gate which can be temporarily closed, if necessary.	DAR, section 8.7.2, and reply to IR2 INAC 2-11.
The following plans will be developed: Water Storage, Treatment and Discharge Monitoring and Management Plan; Solid and Hazardous Waste Management Plan; Explosives Management Plan; Aquatic Effects Monitoring Plan.	DAR, section 10.7.3
Medical personnel will be on call 24/7 to provide medical, educational and counseling services.	Reply to IR GNWT7
Sub-contractors will be required to adhere to all of the Mine's commitments.	CZN May 6, 2011 letter to MVRB
The backfill of flotation tailings as paste will be maximized initially by minimizing use of DMS rock, and bringing all development rock to surface. These restrictions may be relaxed later in the mine's life provided it has been definitely determined that an excess mine void will remain after closure if the backfill strategy remains static.	CZN Sep. 2, 2011 letter to MVRB
All flotation tailings will ultimately be placed underground in mine openings. No flotation tailings will be placed in the WRP or left on surface after mine closure.	CZN Sep. 2, 2011 letter to MVRB

Commitment	Source
Road	
The existing Cat and Grainger Camp sites will be reclaimed. A small tote road to Grainger Camp from the new road alignment would be built for temporary access.	DAR, section 6.3.16
Kledo's general approach to road construction (Appendix B) will be adopted (although CZN is not committed to use Kledo).	Reply to IR2 PC2-1.
The western flank of the Silent Hills contains historic failures, and permafrost may exist along the Polje alignment. These areas will be examined in more detail during the detailed design phase of the project.	DAR, Appendix 16
Side hill cuts and fills will generally be avoided except where the evidence is that the ground is free of ice rich permafrost. Cut material will be used if appropriate, or used elsewhere, but not discarded downslope.	IR reply, Appendix D, and reply to IR2 PC 2-1.
The Polje re-alignment will include fill placement, but gaps/swales will be left so natural runoff flow directions are not significantly modified.	Reply to IR2 PC2-1.
Polje Creek will be spanned with a bridge structure which would remain for the duration of the Mine. The base of the deck will be at least 1m above the normal high water mark. Abutments will be set-back from the top of bank.	Reply to IR2 PC2-1 and DFO 2-5.
All new road alignments will retain the organic layer as much as possible to insulate the underlying soil and limit the potential for permafrost thaw. Adequate drainage will also be provided to avoid unstable slopes.	DAR, section 10.4.2
A level road bed will be created using dozers with shoes fitted on the bottom of the blades. This will ensure minimal disturbance of the organic layer.	IR reply, Appendix E.
Regarding the accumulation of debris on the existing road from upslope, the information will be used to plant he road location with respect to the toe of the slope (in active debris areas).	IR reply, Appendix D.
A geotechnical investigation is proposed to support the final design of the access road. The investigation will focus on portions of the access route west of Km 85, specifically, the proposed polje by-pass and immediately west of Wolverine Pass	IR reply, Appendix D.
The route east of Km 85 will be visually reviewed annually before the following winter. After the first winter of road operations, drainage management at and west of Wolverine Pass will be reviewed, as will the route west of Km 85 to assess the function of cross-road drainage.	IR reply, Appendix D.

Commitment	Source
Construction and maintenance activities will be continually overseen by supervisors who will ensure appropriate techniques are used such that sediment will not be produced during periods of thaw. This will also apply to seasonal road closure activities, including snow-fill removal.	Reply to IR2 DFO 2-5.
Road monitoring will occur during both construction and operation. During construction, monitoring will be daily to assess how recently constructed portions are performing, and to determine requirements for portions being constructed. During operations, monitoring would initially be daily, with a reduction in frequency as road performance becomes better defined. Drivers will report on road conditions and any areas of difficulty or requiring repair. Snow accumulations will also be monitored to assess the potential for avalanches.	Reply to IR2 PC2-1.
After the first year of construction, and following extreme rainfall events at any time, the re-alignments will be checked for areas of instability, specifically the creek crossings, areas of fill placement, and the switch-backs in the Silent Hills. Low over-flights of these areas are initially proposed to allow for inspection. If problem areas are suspected, follow-up inspections will be made by helicopter, and will include set-downs and the use of small tools (e.g. shovels) and readily transportable materials (e.g. silt fence), as necessary. More significant remedial work would be undertaken during construction in the subsequent road season.	Reply to IR2 DFO 2-5.
Closure activities for side hill cut areas will be formulated using the observations and experience gained during the operating period. It is envisaged that material replacement will occur in order to restore a stable natural slope and provide a suitable medium for re-vegetation. Measures will be incorporated into the restored slopes to maintain stable surfaces until a vegetation cover has been established	Reply to IR2 PC2-1.
All trucks on the access road will carry spill kits, and drivers must have read the spill contingency plan and be prepared for an appropriate spill response in relation to their load. Drivers must be suitably qualified and experienced.	DAR, section 10.1
All trucks will have communications, will be on alert for on-coming traffic or wildlife presence in the roadway and will be in contact with a controller.	DAR, section 10.1
All of the vehicles and equipment using the access road will be properly maintained and free of leaks. Stationary equipment will use drip pans.	DAR, section 10.1
Road use (including vehicle speeds and driving conditions) will be monitored by radio and inspections. A journey management system (JMS) will be used (see Appendix I of the IR2 response for details).	DAR, section 10.1

Commitment	Source
The access road bed will be sampled before and after the seasonal haul period as a check on potential contamination from concentrate losses.	DAR, section 10.1
Haul trucks collecting the bags (from the Mine) will pass through a wheel wash before leaving the concentrate storage shed.	DAR, section 9.2
The existing Controlled Road Use Plan will be modified for access road operations to promote safety and minimize the risk of accidents.	DAR, section 10.2
Potentially unstable areas and karst features within 200 m of the access road will be inspected at a frequency dependent on observed conditions and changes or lack thereof of those conditions.	DAR, section 10.4
Temporary crossing structures and snow-fills will be removed at break-up to avoid blockage and erosion.	DAR, section 10.2
A stable road bed will be constructed adjacent to creeks and provide for runoff control and minimize the dispersal of sediment during precipitation events.	DAR, section 10.2
Re-vegetation of riparian areas will be promoted to further reduce the potential for sediment dispersal.	DAR, section 10.2
Chemicals will be transported and stored in approved containers.	DAR, section 10.3.1
The Spill Contingency Plan will address all potentially hazardous substances used at the Mine or transported along the road. The Spill Contingency Plan will contain information that clearly states the responsible party for spill response and clean-up.	Reply to IR2, Appendix I.
Portable spill response equipment will be maintained no more than 50 km from any location along the road. X	Reply to IR2, Appendix I.
The Spill Contingency Plan will include details of spill responses for all types of ground conditions, including frozen and non-frozen ground, and with and without snow cover. Opportunities for the rapid spread of contaminants will also be considered, such as in karst areas.	Reply to IR2, Appendix I.
A trained spill response team will be maintained at the Mine. Operators at the Transfer Facilities will also receive appropriate spill response training. Training will include classroom study, equipment deployment instruction and spill exercises.	Reply to IR2, Appendix I.
Spill exercises will be undertaken in summer (initial training) and winter (final training) conditions, and in locations representing the range of environmental conditions that will exist on the road.	Reply to IR2, Appendix I.
The erection of a guard rail-type barrier on the outer edge of the road from Km 11-16 will be evaluated to reduce the risk of spills along this section where the grade is steep and a tributary of Funeral Creek exists below.	Reply to IR2, Appendix I.
Suitable locations for the construction of run-away lanes will be investigated for sections Km 11-16 and 19-22..	Reply to IR2, Appendix I

Commitment	Source
Specific speed limits may be set for specific types of trucks and loads through sensitive sections.	Reply to IR2, Appendix I.
The road operations supervisor will place limits on hours of driving over a prescribed period.	Reply to IR2, Appendix I.
The road will be regularly inspected and maintained during the operating season to ensure optimal performance and minimize risks from poor road bed conditions.	Reply to IR2, Appendix I.
Trucks will be required to use chains from Km 0 to Km 29.	Reply to IR2, Appendix I.
To respond to spills, an Incident Command System (ICS) will be used that is widely used by governments and industry (see Appendix I of the IR2 reply for details).	Reply to IR2, Appendix I.
A silt or other form of curtain will be stored approximately mid-point between the mine and Funeral Creek ready for deployment to reduce flow in part of Prairie Creek adjacent to a spill.	Reply to IR2, Appendix I.
Control points will be established at key locations, and will include material to create temporary dams, absorbents, booms, board weirs and sand bags. Control points locations will include two upstream tributaries to Funeral Creek, on Sundog Creek just above the main falls and just before the fluvial outwash plain, and downstream of the Tetcela River and Fishtrap Creek crossings	Reply to IR2, Appendix I.
Spill kits will be carried on vehicles with materials appropriate for the loads (i.e. type of sorbent). Comprehensive spill kits will be maintained at the mine site, Cat Camp, the Tetcela Transfer Facility, Grainger Gap, and the Liard Transfer Facility. Custom built and stocked road trailers dedicated to spill response, containing equipment, materials and tools will be considered.	Reply to IR2, Appendix I.
Water Storage Pond	
Mine water will be pumped up to the final sump on the 880 m level, 300 m from the 870 portal. From there, the water will be pumped to the Water Storage Pond. Back-up pumps will be available at the sump to ensure continuous pumping.	DAR, section 6.16.7
The existing pond will be converted into the Water Storage Pond (WSP), with remedial works to stabilize the back slope and a new synthetic liner.	DAR, section 6.3.7.
Repairs to the armour of the flood protection berm will continue when factors are favourable. Critical armour placement is complete. Follow-up work can be completed when circumstances permit, followed by embankment slope reconstruction.	DAR, Appendices 18C and 18D

Commitment	Source
The crest of the WSP will be at elevation 881 m. The operating water level will be between elevations 877 m and 880 m. The dam emergency spillway will be incrementally below the 881 m crest elevation. The spillway will be located in the eastern dyke of the WSP so that in the highly unlikely event of an emergency controlled discharge, flows would report to the site surface water management system inside the flood protection berm.	Reply to IR PC41
The WSP will be operated with a 1 metre freeboard which will be maintained at all times, unless a short-term emergency storage requirement occurs.	CZN May 6, 2011 letter to MVRB
Detailed design of WSP surface water diversion ditches will be completed after site grading plans have been prepared as part of final design. The IR reply,	Appendix D, and reply to IR2
Ditches will be lined. Monitoring plans will be included. The upslope area will be graded. The frequency and magnitude of extreme events (rainfall, snowmelt) in terms of stability analysis and design of diversions will be considered further as part of detailed design	INAC 2-6 and NRCan 2-2.
Water	
A new Mine Water Contingency Plan will be developed.	DAR, section 10.7.2
Seepage from the Waste Rock Pile will be collected in a lined pond and transferred to the Water Storage Pond, as will drainage from the lined DMS rock and ore stockpiles. Pond size and emergency spillway details will be confirmed during final design	DAR, sections 6.16.8 and 8.9.1, and IR reply, Appendix D.
The Waste Rock Pile lined seepage collection pond will be connected to the site water management system, either by pipeline or by borehole to the underground Mine workings. The pond will be sized to store 6500 m3 with a 1 m freeboard (accommodating the 1 in 100 year storm event). The pond will have a spillway to discharge flows that exceed pond capacity. The spillway will be located to discharge the peak flows entering the pond without displacing the water already in the pond. Sediment accumulations will be monitored and removed, as necessary. The WRP will have diversions around the pile footprint to prevent runoff from outside the footprint reporting to the pile collection pond. WRP site preparation and pond construction will include oversight and approval by a qualified engineer. The operation plan will include adjacent vegetation preservation to maintain the slope cover	DAR, section 8.7.4 and Appendix 11, and IR reply, Appendix D.
Flows in Prairie Creek will be monitored continuously, and information relayed to the control room in the Water Treatment Plant.	IR2 reply, Appendix F.

Commitment	Source
Further investigation of the WSP will be undertaken to determine the northern extent of the clay layer and condition of embankment clay. During construction, a quality assurance program will be implemented to ensure the intent of the design is achieved. A maintenance program for the north slope and embankments will be developed and will form part of an Operations and Maintenance Manual. A series of slope inclinometers, thermistor strings and piezometers will be installed after construction. Results will be analysed by a qualified engineer. Measures will be taken to control vegetation growth and to monitor for erosion.	DAR, Appendix 12
A 1 metre freeboard will be maintained in the Water Storage Pond, and a lower operating level will be selected to maintain back slope stability. The water level will be closely monitored. Runoff from upslope will be diverted in lined ditches, west to Prairie Creek and east to the main camp ditch.	DAR, sections 8.7.5 and 8.8.1
If the dyke between the WSP and the Mine site were to fail, contaminated water could be released. The Catchment Pond outlets would be closed to contain the release. The Mill would stop operating so that process effluent is not being sent to the WSP or the treatment plant. The treatment plant would treat only Mine water and the water released from the WSP until the pond is repaired.	DAR section, 8.8.3
If a failure occurs upslope of the WSP that puts it out of commission, Mill operations may be stopped and all Mine water treated and discharged until the WSP is back in operation.	DAR, section 9.2
Only phosphate-free detergents will be used on-site. Alum will be added to precipitate phosphates. Sewage effluent will be pumped to the Water Storage Pond. Nitrogen concentrations will be minimized by using emulsion explosives with strict explosive management practices	DAR, sections 6.16.6 and 6.16.8, and reply to IR2 EC 2-1.
Sewage produced in outlying areas will be collected and transported to the Sewage Treatment Plant. Grey water will be treated the same as sewage.	DAR, sections 6.16.6 and 6.16.8, and reply to IR2 PC-7.
During construction, sedimentation from the WRP will be controlled using silt fencing, erosion control blankets or other technologies, as necessary. The completed drainage channels will include erosion and sedimentation control technologies. The performance of these channels will be monitored.	IR reply, Appendix D.
Discharge water quality and the receiving environment's ability to absorb the discharge will be closely monitored. Metals analysis capability will be available on site.	DAR, section 8.6 and NBDB-CZN Meeting Report, June 10, 2010.

Commitment	Source
During operations, data on actual and potential metal release from the Mine and WRP will be collected and assessed to further develop mitigation and monitoring plans for closure.	DAR, section 8.6
The Mine water treatment plant will be initially sized to treat 134 L/sec, but can be readily expanded to double the capacity (268 L/sec).	DAR, section 8.7.3
The WTP will include a clarifier to remove suspended matter and ensure discharge has low TSS.	DAR Addendum, section 7.1
The water treatment plants will have double pumping systems (one operating and one on stand-by). Stand-by power would operate both plants if power was lost from the main power plant	DAR, section 8.7.3
Treated water quality will be monitored closely to ensure discharge quality meets specified criteria. If water quality is unacceptable, discharge would be stopped by re-circulating the treated water inside the plant, then either the treatment capacity will be increased, or inflows from outside the plant will be stopped and flows will be diverted to the Water Storage Pond.	DAR, section 8.7.3
If discharge concentrations (to Prairie Creek) are higher than predicted, or monitoring detects changes which were not predicted, the response will depend on the parameters considered to be causing the problems, and when they occur. A review of water treatment schedule and performance will be undertaken in conjunction with toxicity studies in order to define the source of the variance from predictions.	Reply to IR2 EC 2-1.
An AEMP will be designed and implemented for the project in accordance with INAC's "Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories - 2007."	CZN May 6, 2011 letter to MVRB
Once water quality objectives (WQO's) for Prairie Creek have been determined and agreed to, the Mine will manage the project so that they are met consistently, unless un-related circumstances occur (such as unforeseen natural events) that prevent the Mine from doing so.	CZN May 6, 2011 letter to MVRB
The Mine will manage the project so that the WQO's are met at the assessment boundary, unless other circumstances occur beyond the Mine's control.	CZN May 6, 2011 letter to MVRB
The WQO's will be considered applicable for all mechanisms of effluent discharge from the project (e.g. one or two exfiltration pipes, etc).	CZN May 6, 2011 letter to MVRB
The discharge of treated process water will not occur during the months of February and March.	CZN May 6, 2011 letter to MVRB
Treated process water discharge during other winter months will be less than in other seasons, and will be managed to ensure a minimum dilution ratio with creek water flow (see Appendix C) is maintained.	CZN May 6, 2011 letter to MVRB

Commitment	Source
Effluent that is acutely toxic will not be discharged.	CZN May 6, 2011 letter to MVRB
Effluent that does not meet the conditions of the Water License (e.g. EQC's) will not be discharged.	CZN May 6, 2011 letter to MVRB
Additional 'active water storage will be provided, either by modifications to the existing WSP or by building a second WSP.	CZN Aug. 21, 2011 letter to MVRB
If modifications to the existing WSP are proposed and include raising the dykes, the dyke adjacent to Prairie Creek would be raised by upstream methods to avoid any further encroachment on the floodplain.	CZN Aug. 3, 2011 letter to MVRB
If a second WSP is built, it will be double-lined, and set back at least 30 m from the normal high water mark of Prairie Creek. Water conveyed to and from the pond will be via pipelines equipped with pressure sensors, and a pressure drop would trigger the shut off of pumps delivering the water. The pipelines will be routed over lined ditches or other containment structures so that any spills will be contained.	CZN Aug. 3 and 21, 2011 letters to MVRB
The treatment of process water will be improved by either enhancing the currently proposed system, or adopting a precipitation-ion exchange system.	CZN Sep. 2, 2011 letter to MVRB
A consequence of initially maximizing the backfill of flotation tailings is a possibility of more DMS rock reporting to the WRP. Geochemical studies indicate changes in WRP leachate should not be significant. However, as a precaution, the DMS rock will be segregated from development rock and placed in the upslope portions of the WRP so that additional control measures to limit seepage can be implemented on mine closure, if required.	CZN Sep. 2, 2011 letter to MVRB
The majority of seepage from the WRP is expected to report to a seepage collection pond at the toe of the pile. The remainder is expected to percolate downwards and be captured in the cone of groundwater depression created by mine dewatering. There is a small risk that some subsurface seepage may evade the seepage collection pond and discharge to Harrison Creek. To mitigate this risk, a shallow groundwater interception system will be installed consisting of a cut-off trench along the toe of the WRP. The depth of the trench and other details will be confirmed as part of site investigations leading to detailed WRP design.	CZN Sep. 16, 2011 letter to MVRB
Air	
The existing power generating units will be replaced with fuel efficient, compact generators with lower emissions. The existing exhaust stacks will be replaced with a single stack.	DAR, section 6.3.1

Commitment	Source
A new, low emission incinerator will be brought in to incinerate Camp waste daily. The waste stream will not include plastics or sewage sludge.	DAR, section 6.3.9.
Mitigation and adaptive management strategies and plans will be developed to minimize emissions related to fugitive dust and incineration.	DAR, section 10.5.
Air quality monitoring will likely include sampling for TSP, PM10 and PM2.5 at a minimum of one location on the project boundary (perhaps adjacent to the creek). Passive monitoring stations for SO2 and NO2 would likely be co-located with the particulate monitoring station(s). A dust-fall monitoring program on the project boundary and adjacent (off-site) to significant material handling locations would also be proposed. Assessment of program requirements will be conducted in consultation with EC/ENR.	IR reply, Appendix M.
Mine Closure	
Hydrogeological and geochemical data will be collected routinely during operations in order to update predictions of the behaviour of the backfill and groundwater and surface water quality after mine closure. Post-closure monitoring will include wells that monitor the mine 'pool', wells that monitor groundwater quality along the flow-path of metal release in bedrock and in the alluvial aquifers (HCAA and PCAA), and stations on Prairie Creek. Trigger levels linked to specified response actions will be set for selected monitoring wells to give an 'early warning' of a developing issue. Further study will be required during the operating period to better quantify the flow-path and attenuation mechanisms.	Reply to IR GNWT2, and reply to IR2 INAC 2-3.
All flotation tailings will ultimately be placed underground as a paste backfill. No mine waste will remain on the Prairie Creek floodplain after closure.	DAR, section 6.12.2
All sediment and tailings residues remaining in the WSP after closure will be recovered and included in underground backfill.	DAR Addendum, section 2
A natural cover will be placed on the WRP to limit infiltration and seepage and promote re-vegetation. The final composition of the cover will be based on WRP monitoring during operations. The water management ditches and other water control facilities will be upgraded, re-constructed or decommissioned as necessary. The seepage collection pond will be decommissioned once testing of runoff meets criteria. The Waste Rock Pile (WRP) final slope angle, cover design and runoff diversion structures will be designed to be stable in perpetuity.	DAR, section 12 and Appendix 11, and reply to IR2 INAC 2-16.

Commitment	Source
Re-vegetation of the Mine site will rely on natural invasion to avoid introducing exotic species. Observations of natural re-vegetation around the mine site and along unused portions of the access road will be recorded to justify the adoption of this approach to reclaim disturbed areas.	DAR, section 12 and reply to IR GNWT2
Parks Canada wishes to initiate a study prior to road operations concerning techniques that might be used to improve re-vegetation and reclamation. Collaboration from the Mine was requested and agreed to in the form of accommodation/meals and assistance with transport.	Technical Meeting, Day 2, Oct. 7, 2010
For the first 3 years after closure, monitoring and inspections will occur monthly over the period March to November. Annual reports will be produced. In the following 5 years, monitoring and inspections will occur bi-monthly from May to September. In the final 5 years, monitoring and inspections will occur once a year in July (post-freshet). However, post-closure monitoring will continue until conditions have reached equilibrium and stabilized, and it has been conclusively determined that no further closure activities are required.	DAR, section 8.9.4, and reply to IR2 NR Can 2-6.
Updates to the closure and reclamation plan, including updated water quality predictions, are proposed for the time of Water License renewal, normally every 5 years.	Reply to IR GNWT2

Appendix C: Public registry index

PR Item #	Document Name	Date Received	Originator
1	EA Referral by AANDC to MVRB	08-Aug-08	AANDC
2	Letter from MVRB to CZN re: referral	11-Aug-08	MVRB
3	Notice of EA for CZN Prairie Creek Mine – distribution list	13-Aug-08	MVRB
4	Final Prairie Creek Geochemistry Report April 2008	14-Aug-08	CZN
5	Prairie Creek Mine Project Description Report	14-Aug-08	CZN
6	Liard Transfer Facility Project Description Report	14-Aug-08	CZN
7	Tetcela Transfer Facility Project Description Report	14-Aug-08	CZN
8	Comments from CPAWS	15-Aug-08	CPAWS
9	EC and DFO comments for Prairie Creek Mine	22-Aug-08	EC, DFO
10	Comment from Parks Canada	22-Aug-08	PC
11	Canadian Zinc Response to comments	22-Aug-08	CZN
12	Comments from GNWT	22-Aug-08	GNWT
13	Comments from Acho Dene Koe First Nations	11-Aug-08	AKDFN
14	Comments from MLA Nahendeh	11-Aug-08	K. Menicoche
15	Correspondence between CZN and MVLWB	25-Aug-08	MVLWB
16	Preliminary Screening Application – Liard Transfer Facility	25-Aug-08	CZN
17	Preliminary Screening Application – Tetcela Transfer Facility	25-Aug-08	CZN
18	Prairie Creek Mine LUP Application	25-Aug-08	CZN
19	Application & Supporting Materials for Water License	26-Aug-08	CZN
20	Scoping Phase Instructions for Distribution List	29-Aug-08	MVRB
21	Notice of Scoping Sessions	29-Aug-08	MVRB
22	Canadian Zinc Corp. Site Visit Information	2-Sep-08	MVRB
23	Environmental Assessment Update September 4, 2008	4-Sep-08	MVRB
24	Letter to CZN from MVEIRB – Information Request	9-Sep-08	MVRB
25	EA Update – Scoping Phase	19-Sep-08	MVRB
26	MVLWB Final Preliminary Screening Decision Documents	18-Sep-08	MVLWB
27	NBDB request to AANDC for Referral to EA	22-Sep-08	NBDB
28	Daytime Agenda for Dehcho Scoping Sessions	23-Sep-08	MVRB
29	Evening Agenda for Fort Simpson Scoping Session	23-Sep-08	MVRB
30	Canadian Zinc Corp. EA Scoping Position	25-Sep-08	CZN
31	Relevant Pre-Existing Materials for Scoping from CZN	25-Sep-08	CZN
32	MOU Between Parks Canada and CZN	25-Sep-08	CZN, PC
33	Note to File – Site Visit – CZN Prairie Creek Mine EA	1-Oct-08	MVRB
34	LKFN Letter of Support for Prairie Creek Mine	6-Oct-08	LKFN

35	Summary of Project Description	6-Oct-08	CZN
36	Presentation from CZN to Communities about the Project Description	6-Oct-08	CZN
37	Presentation by CZN to Communities About Potential Impacts	6-Oct-08	CZN
38	October 9th Technical Issues Scoping Session	6-Oct-08	MVRB
39	A List of Prairie Creek Mine Components	6-Oct-08	MVRB
40	MVEIRB Presentation – Introduction to Scoping Sessions	6-Oct-08	MVRB
41	MVEIRB Introduction to Environmental Assessment Presentation	6-Oct-08	MVRB
42	Audio Recording of CZN Scoping Sessions in the Dehcho	10-Oct-08	MVRB
43-47	draft meeting minutes from scoping sessions, Final Minutes PR#78-82		MVRB
48	Scoping Submission from Fort Simpson	7-Oct-08	Village of Fort Simpson
49	Note to File – Request for Extension Response	10-Oct-08	MVRB
50	Request for Extension from CPAWS	9-Oct-08	CPAWS
51	Request for Extension from DCFN	9-Oct-08	DCFN
52	Audio Recording of Technical Scoping Session – YK	9-Oct-08	MVRB
53	Developers Technical Scoping Session Presentation – Project Description	10-Oct-08	CZN
54	Developers Impact Considerations Presentation – Technical Scoping Session	10-Oct-08	CZN
55	Notice of Website Back On-Line	14-Oct-08	MVIB
56	Scoping Submission from Stephen and Marjorie Herrett	16-Oct-08	S and M Herrett
57	Scoping Submission from Wildlife Conservation Society	14-Oct-08	WCS
58	Public Comments (#1-100) on Prairie Creek Mine EA	16-Oct-08	Public comments
59	Public Comments (#101-256) on Prairie Creek Mine EA	16-Oct-08	Public comments
60	Submission from Black Feather Wilderness Adventure Company	17-Oct-08	Black Feather
61	Comments from Nahanni River Adventures	19-Oct-08	Nahanni River Adventures
62	Scoping Submission from Kirby Groat of Fort Simpson	17-Oct-08	Kirby Groat
63	Letter Identifying Relevant Pre-existing Materials From CZN	17-Oct-08	CZN
64	Scoping Submission from Environment Canada	20-Oct-08	EC
65	Scoping Submission from Dehcho First Nations	14-Oct-08	DCFN
66	Scoping Submission from Chamber of Mines	20-Oct-08	Chamber of Mines
67	Scoping Submission from DFO	20-Oct-08	DFO
68	Scoping Submission from AANDC	14-Oct-08	AANDC
69	Submission from Joe Acorn on behalf of the Nahanni Butte Dene Band	31-Oct-08	NBDB
70	Scoping Submission from the GNWT	20-Oct-08	GNWT
71	Scoping Submission from Parks Canada	20-Oct-08	PC
72	Scoping Submission from CPAWS	20-Oct-08	CPAWS

73	Canadian Zinc Answers Questions from Wrigley Scoping	21-Oct-08	CZN
74	Copy of press release detailing MOU between LKFN and CZN	21-Oct-08	CZN
75	Scoping Submission from LKFN	21-Oct-08	LKFN
76	Public Comments on Prairie Creek Mine #257-264 and 267	23-Oct-08	Public comments
77	Updated Distribution List – November 20, 2008	20-Nov-08	MVRB
78	Final Meeting Minutes for Nahanni Butte Scoping Session	9-Oct-08	MVRB
79	Final Meeting Minutes for Fort Liard Scoping Session	9-Oct-08	MVRB
80	Final Meeting Minutes Evening Scoping – Fort Simpson	9-Oct-08	MVRB
81	Final Meeting Minutes for Scoping in Wrigley	14-Oct-08	MVRB
82	Final Meeting Minutes Fort Simpson Day Session	10-Oct-08	MVRB
84	Final Meeting Report from the Yellowknife Technical Scoping	27-Oct-08	MVRB
85	Note to File – Next Steps After Scoping Submissions	31-Oct-08	MVRB
86	MOU Between NBDB and CZN	4-Nov-08	MVRB, NBDB
87	Submission from CZN Regarding Scoping Suggestion for EA	3-Nov-08	CZN
88	Storage Pond Water Estimates	5-Nov-08	CZN
89	Canadian Zinc Corp. vs. Mackenzie Valley Land & Water Board 2005 NWTSC 48	6-Nov-08	EcoJustice
90	CZN 2003 Application for Winter Access Road Development	6-Nov-08	EcoJustice
91	2007 Approval of Winter Road Land Use Permit	6-Nov-08	Ecojustice
92	MVLWB Reasons For Decision – Winter Road Permit	6-Nov-08	Ecojustice
93	Type B Water Licence Application for Winter Road Repairs	6-Nov-08	Ecojustice
94	Request for Ruling from Dehcho First Nations and CPAWS	6-Nov-08	Ecojustice
95	Timelines for Input on Request for Ruling	7-Nov-08	MVRB
96	MOU Issued by NBDB October 28, 2008	7-Nov-08	NBDB
97	Public Comments #265 and #266	29-Oct-08	Public comments
98	Spill Contingency Guidelines – Submission Recommendation from AANDC	24-Nov-08	AANDC
99	Reclamation Guidelines – Submission Recommendation from AANDC	24-Nov-08	AANDC
100	Reclamation Policy – Submission Recommendation from AANDC	24-Nov-08	AANDC
101	Note to File – Update	24-Nov-08	MVRB
102	Review Board Directive on Request for Ruling and IRs #1-4	27-Nov-08	MVRB
103	RfR 1 of 56 – LUP N80D248 to Cadillac Explorations for mining exploration and development – March 4, 1980	26-Nov-08	CZN
104	RfR 2of 56 – LUP N80D248 to Cadillac Explorations for Winter Access Route- March 4, 1980	26-Nov-08	CZN
105	RfR 3 of 56 – Chapter 5 only of Environmental Evaluation for Cadillac Explorations Prairie Creek Mine – October 1980	26-Nov-08	CZN
106	RfR 4 of 56 – Preliminary Evaluation by Ker, Priestman	26-Nov-08	CZN
107	RfR5 of 56 – Preliminary Evaluation for Winter Access Road – May 1981	26-Nov-08	CZN
108	RfR 6 of 56 – Incomplete Summary of Aquatic Studies – April 30, 1981	26-Nov-08	CZN

109	RfR 7 of 56 – Prairie Creek Project Vegetation and Wildlife Studies – September 1981	26-Nov-08	CZN
110	RfR 8 of 56 – Water License N3L-0932 – July 1982	26-Nov-08	
111	RfR 9 of 56 – Wildlife Studies, 1982 Addendum	26-Nov-08	CZN
112	RfR 10 of 56 – Correspondence prior to San Andreas Mine Permits	26-Nov-08	AANDC
113	RfR 11 of 56 – Summary Reports for Water & Fish Studies – April 1994	26-Nov-08	AANDC
114	RfR 12 of 56 – Winter Road Access Application and Supporting Documents, 1994	26-Nov-08	AANDC
115	RfR 13 of 56 – Issuance of Land Use Permit N95C373 for Diamond Drilling, 1995	26-Nov-08	AANDC
116	RfR 14 of 56 – Draft Guidelines for Environmental Assessment Report, June 1995	26-Nov-08	AANDC
117	RfR 15 of 56 – Series of Correspondence re: Application for All Weather Road	26-Nov-08	AANDC
118	RfR 16 of 56 – Material Related to MV2000C003	26-Nov-08	AANDC
119	RfR 17 of 56 – Comments from AANDC to MVEIRB re: Decline and Pilot Plant EA, May 2001	26-Nov-08	AANDC
120	RfR 18 of 56 – Material Related to MV20011C0022-March 2001	26-Nov-08	AANDC
121	RfR 19 of 56-Material related to MV2001C0023	26-Nov-08	AANDC
122	RfR 20 of 56-Application for Type B water license for Pilot Project, MV2001L2-0003	26-Nov-08	CZN
123	RfR 21 of 56-Affidavit of Alan Taylor of CNZ, 2004	26-Nov-08	CZN
124	RfR 22 of 56-Material related to Fuel Spill Contingency Plan, 2004	26-Nov-08	CZN
125	RfR 23 of 56-Material related to Maximum Probable Flood Calculations, 2005	26-Nov-08	CZN
126	RfR 24 of 56-Material related to Mine Water Contingency Plan for MV20001L2-0003	26-Nov-08	CZN
127	RfR 25 of 56-Mateial related to Effluent Treatment Options Plan, 2006	26-Nov-08	CZN
128	RfR 26 of 56-Issuance of Land Use Permit MV2004C0030	26-Nov-08	
129	RfR 27 of 56-Material related to Request for Extension of Phase 2 Drilling	26-Nov-08	CZN
130	RfR 28 of 56-Material related to Polishing Pond Construction and Geotechnical Assessment	26-Nov-08	CZN
131	RfR 29 of 56-Material related to Wildlife Management Plan Decline and Pilot Plant Operation	26-Nov-08	CZN
132	RfR 30 of 56- Material related to Waste Rock and Ore Pile Monitoring Plan, 2006	26-Nov-08	CZN
133	RfR 31 of 56- Material related to Wildlife Survey Phase 3 Drilling, 2006	26-Nov-08	CZN
134	RfR 32 of 56-Material related to Application for Winter Access Road	26-Nov-08	CZN
135	RfR 33 of 56-Controlled Road Use Plan for Winter Access Road, 2007	26-Nov-08	CZN
136	RfR 34 of 56-Material related to Tank Farm Inspections and Flood Erosion Protection	26-Nov-08	CZN
137	RfR 35 of 56-Material related to Type B Water License MV2007L8-0026	26-Nov-08	CZN
138	Submission: Protecting the Aquatic Quality of NNPR	24-Nov-08	AANDC
139	Protecting the Waters of Nahanni National Park Reserve	24-Nov-08	AANDC
140	Note to File: Change of date of pre-hearing conference to December 17	27-Nov-08	MVRB

141	Correspondence from Joe Acorn to MVRB re: Nahanni Butte Community Support	10-Dec-08	NBDB
142	EC response to IR#4	11-Dec-08	EC
143	IR #2 response from CZN	12-Dec-08	CZN
144	RfR 36 (2 of 3) West et al. presentation on upstream mining impacts on fish in NNPR	19-Dec-08	AANDC
145	RfR 36 (3 of 3) University of Sask/AANDC 2006 Prairie Creek Monitoring Program Report	19-Dec-08	AANDC
146	PC Response to IR#4		AANDC
147	RfR 36 (1of 3) Interim Report: Fisheries Survey of Prairie Creek Watershed 2001	19-Dec-08	AANDC
148	DFO response to IR#4	12-Dec-08	DFO
149	AANDC response to IR#1	15-Dec-08	AANDC
150	CPAWS response IR#3, with attachments	12-Dec-08	CPAWS
151	Agenda for request for ruling Pre-hearing conference	16-Dec-08	MVRB
152	Audio recording of December 17th pre-hearing conference	17-Dec-08	MVRB
153	Notice of extension to deadlines for request for ruling submissions	18-Dec-08	MVRB
154	RfR 39 of 56-Correspondence related to D80D248	19-Dec-08	AANDC
155	RfR 40 of 56-Correspondence related to N80F249-Winter Road	19-Dec-08	AANDC
156	RfR 41 of 56-Correspondence related to both Original Mine and winter road	19-Dec-08	AANDC
157	RfR 42 of 56-Application for Quarry Permit	19-Dec-08	AANDC
158	RfR 43 of 56-Correspondence related to N3L3-0932	19-Dec-08	AANDC
159	RfR 50 of 56-Summary Document-Prairie Creek Project, Water Quality & Aquatic Biology	19-Dec-08	AANDC
160	RfR 51 of 56-Oil & Toxic Material Spill contingency Plan	19-Dec-08	AANDC
161	RfR 49 of 56- Fisheries & Invertebrate studies, 1981	19-Dec-08	AANDC
162	RfR 48 of 56- Geological Report & Ore Calculations N3L3-0932	19-Dec-08	AANDC
163	RfR 47 of 56-Tailings Storage and Mine Plant Facilities Report	19-Dec-08	AANDC
164	RfR 46of 56- NWT Water Board public hearing on application for Water License, 1982	19-Dec-08	AANDC
165	RfR 45of 56-NWT Water Board public hearing on application for Water License, May 1981	19-Dec-08	AANDC
166	RfR 44 of 56- NWT Water Board public hearing on application for Water License, April 1981	19-Dec-08	AANDC
167	RfR 52 of 56- Correspondence related to N92C778	19-Dec-08	AANDC
168	RfR 53 of 56-Land Use Permit N92C778	19-Dec-08	AANDC
169	RfR 54 OF 56- Correspondence related to N92C778	19-Dec-08	AANDC
170	RfR 55 of 56-Correspondense related to N95C373	19-Dec-08	AANDC
171	Table listing RfR documents 36 through 55	19-Dec-08	AANDC
172	Letter from NBDB to MVRB	19-Dec-08	
173	RfR 37 of 56- Preliminary environmental evaluation May 1980 by Ker Priestman	19-Dec-08	
174	RfR38 (1 of 3)-Final 1980 environmental assessment report-text only	19-Dec-08	

175	RfR38 (2 of 3)- Final 1980 environmental assessment appendices 1-3	19-Dec-08	
176	RfR38 (3 of 3)-Final 1980 environmental assessment appendices 4-10	19-Dec-08	
177	RfR56-PC and AANDC comments on 1980 environmental evaluation	23-Dec-08	
178	Meeting minutes from Dec 17th Pre-hearing conference	24-Dec-08	
179	GNWT Initial Request for Ruling Response Letter	14-Jan-09	
180	Initial Federal Government Response to Request for Ruling	14-Jan-09	
181	CZN Initial Response to Request for Ruling	14-Jan-09	CZN
182	Ecojustice Initial Response to Request for Ruling Question#2	14-Jan-09	Ecojustice
183	Ecojustice ref 1- North American Tungsten vs. MVLWB, 2003 NWTCA 5	14-Jan-09	Ecojustice
184	Ecojustice ref 2- Chicot vs. Paramount Res. Ltd, 2006 NWT S C 30	14-Jan-09	Ecojustice
185	Ecojustice ref 3- Draft MVBB Guidelines for Wildlife at Risk	14-Jan-09	Ecojustice
187	GNWT Request for Ruling Response to Jan 14 Submissions	19-Jan-09	GNWT
188	Ecojustice Reply on Questions 1 and 2 for Request for Ruling	19-Jan-09	Ecojustice
189	Comments from CZN re: Submissions for Request for Ruling	19-Jan-09	CZN
190	Note to File regarding CPAWS footnotes	22-Jan-09	MVRB
191	CPAWS Footnote 16-CZN-Scoping study 2001	26-Jan-09	CPAWS
192	CPAWS Footnote 26 & 27-World Heritage Information	26-Jan-09	CPAWS
193	CPAWS Footnote 28- Boreal Below Report	26-Jan-09	CPAWS
194	CPAWS Footnote 31-Acid mine drainage and its effects on Fish Health and Ecology	26-Jan-09	CPAWS
195	CPAWS Footnote 32- Water Issues and Mineral and Metals	26-Jan-09	CPAWS
196	CPAWS Footnote 34- Comparison of Predicted and Actual Water Quality	26-Jan-09	CPAWS
197	CPAWS Footnote 39- Big Animals and Small Parks	26-Jan-09	CPAWS
198	CPAWS Footnote 40-Letter from John Weaver	26-Jan-09	CPAWS
199	CPAWS Footnote 43- Fisheries Survey of Prairie Creek Water shed	26-Jan-09	CPAWS
200	CPAWS Footnote 47-Letter to Dr. Rao-UNESCO	26-Jan-09	CPAWS
201	CPAWS Footnote 48-Rock and Roll in the NWT	26-Jan-09	CPAWS
202	CPAWS Footnote 49- Earthquake-Induced Static Stress of the 1985 Nahanni Earthquake	26-Jan-09	CPAWS
203	CPAWS Footnote 52-Eathquakes and Seismic Hazard in the Yukon	26-Jan-09	CPAWS
204	CPAWS Footnote 55-Respect for the Land	26-Jan-09	CPAWS
205	LKFN letter regarding the correspondence of Ecojustice	23-Jan-09	LKFN
206	Note to File-Correspondence with Grand Chief Antoine	28-Jan-09	MVRB
207	Letter form DFN-Grand Chief Gerald Antoine	29 Jan-09	DFN
208	Change to RfR#32	30 Jan-09	MVRB
209	Scoping comments by Senator Nick Sibbeston	6-Feb-09	N Sibbeston
210	MVRB ruling on scope of development issues	5-Mar-09	MVRB
211	CZN initial response to scope of development ruling	12-Mar-09	CZN
212	Note to file-discussion with BC EAO	13-Mar-09	MVRB
213	Section 79 SARA letter-Review Board to Environment Canada	5-May-09	MVRB
214	Boundary Options of Proposed NNPR Expansion	11-May-09	PC

215	Draft Work Plan and cover letter	11-May-09	MVRB
216	Draft terms of Reference	11-May-09	MVRB
217	CZN request for time to respond to draft ToR comments	3-Jun-09	CZN
218	EC Response to MVRB SARA notification letter	11-Jun-09	EC
219	EC comments on draft Terms of Reference and Work Plan	12-Jun-09	EC
220	AANDC comments on draft Terms of Reference and Work Plan	12 Jun-09	AANDC
221	NRCan comments on draft Terms of Reference	12 Jun-09	NRCan
222	GNWT comments on draft Terms of Reference	12 Jun-09	GNWT
223	DFO comments on draft Terms of Reference	12 Jun-09	DFO
224	CPAWS comments on draft Terms of Reference	12 Jun-09	CPAWS
225	TC comments on draft Terms of Reference	12 Jun-09	TC
226	CZN comments on draft Terms of Reference and Work Plan	12 Jun-09	CZN
227	PC comments on draft Terms of Reference	11 Jun-09	PC
228	Boundaries of expanded Nahanni National Park Reserve	11 Jun-09	PC
229	CPAWS response to CZN request to comment on draft ToR submissions	11 Jun-09	CPAWS
230	NBDB comments on draft ToR and Work Plan	17 Jun-09	NBDB (via Joe Acorn)
231	Developer response to draft Terms of Reference comments by interested parties	19 Jun-09	CZN
232	NRCAN response to CZN comments re: Nahanni North Karst	23 Jun-09	NRCan
233	Correspondence from CZN to MVRB-re: invitation to site visit	23 Jun-09	CZN
234	Work plan for Prairie Creek Mine environmental assessment	26 Jun-09	MVRB
235	Final Terms of Reference for the Prairie Creek Mine EA	26 Jun-09	MVRB
236	Cover letter for final ToR and Work Plan and change of lead EAO	26 Jun-09	MVRB
237	MVRB response to CZN site visit invitation	2-Jul-09	MVRB
238	Notice of new lead EAO	24 Jul-09	MVRB
239	MVRB Prairie Creek Mine Canadian Zinc Site Tour Report July 16 2009	29 Jul-09	MVRB
240	PCM-NWT CC	25-Aug-09	NWT CC
241	NDDB Aug 26, 2009	31-Aug-09	NBBD
242	Prairie Creek Mine winter road re-alignments	9-Sep-09	CZN
243	NBDB TK Assessment Addendum Report response	15-Sep-09	MVRB
244	TK Addendum Report Notification	21-Sep-09	NBDB
245	TK Assessment Report Addendum August 31 2009 Final MVEIRB Public Version	21-Sep-09	NBDB
246	Response to CZN on access route re-alignments	21-Sep-09	MVRB
247	Notification of MVRB experts	27-Nov-09	MVRB
248	Hatch Ltd. CVs	27-Nov-09	MVRB
249	DAR submission date-Review Board Request	29-Jan-10	MVRB
250	DAR submission date	8-Feb-109	CZN
251	Nahanni National Park Reserve expansion	11-Feb-109	PC

252	DAR presentation suggested	29-Mar-10	MVRB
253	Developer's Assessment Report received	30-Mar-10	MVRB
254	Developer's Assessment Report-hard copy distribution	6-Apr-10	CZN
255	Developer's Assessment Report and Appendices	6-Apr-10	CZN
256	Notice of DAR Open Houses	8-Apr-10	CZN
257	Table 13-1 Cumulative Contaminant Loads	15-Apr-10	CZN
258	Conformity Check and Deficiency statement	23-Apr-10	MVRB
259	Letter from Sambaa K'e Dene Band	27-Apr-10	SDB
260	Request for Party Status application	19-May-10	MVRB
261	Addendum to Developer's Assessment Report	20-May-10	CZN
262	Updated Work Plan	28-May-10	MVRB
263	DAR Conformity Determination and Information Requests	28-May-10	MVRB
264	Aquatic Effects Monitoring Plan for the Prairie Creek Mine-Addendum to CZN Developer's Assessment Report	3-Jun-10	CZN
265	Nahanni Butte Dene Band Critique of the Socio-Economic Impact Assessment for the Prairie Creek Mine	12-Jun-10	Peters Redvers-Crosscurrent Associates Ltd.
266	Reminder to the Prairie Creek Mine Distribution List regarding the June 25th 2010 Deadline for Information requests	18-Jun-10	MVRB
267	Request for extension to IR submission deadline	21-Jun-10	AANDC
268	Extension to Information Request submission deadline	23-Jun-10	MVRB
269	Party status granted	24-Jun-10	MVRB
270	Minutes form GNWT and CZN meeting	23-Jun-10	GNWT
271	Meeting Minutes-Nahanni Butte Dene Band and Canadian Zinc corp.	30-Jun-10	CZN
272	Meeting Minutes-CZN and other parties	2-Jul-10	CZN
273	PC-Information Requests	2-Jul-10	PC
274	Information Requests-NRCan	2-Jul-10	NRCan
275	AANDC-Information Requests	2-Jul-10	AANDC
276	GNWT- Information Requests	2-Jul-10	GNWT
277	CPAWS-Information Requests	2-Jul-10	CPAWS
278	EC-Information Requests	2-Jul-10	EC
279	Fisheries and Oceans Canada-Information Requests	2-Jul-10	DFO
280	Fisheries and Oceans Canada-IR Cover Letter	2-Jul-10	DFO
281	TC-Information Requests	6-Jul-10	TC
282	Instructions on Information Requests	23-Jul-10	MVRB
283	Technical Meeting notification	6-Aug-10	MVRB
284	Letter from CZN on Socio-economic Impact Assessment	17-Aug-10	CZN
285	Reply to SDB letter dated April 28, 2010	17-Aug-10	CZN
286	Non-Regulatory Agreements	16-Aug-10	CZN
287	AANDC-non-regulatory agreements response	16-Aug-10	AANDC

288	Clarification on Information Requests and an IR to government	26-Aug-10	MVRB
289	Information Request response-PC	26-Aug-10	PC
290	Additional information request deadline-government parties	30-Aug-10	MVRB
291	Access road meeting minutes	30-Aug-10	AANDC
292	IR response from EC	7-Sep-10	EC
293	Responses to Information Requests notification	13-Sep-10	CZN
294	Technical Meeting –draft agenda	14-Sep-10	MVRB
295	Technical Meeting-date change request	15-Sep-10	DECHO FN
296	Request for date change to Technical Meeting	16-Sep-10	PC
297	Technical Meeting date change	17-Sep-10	MVRB
298	Updated maps from Appendix D of IR Response document	20-Sep-10	MVRB
299	Technical Meeting Change of Dates	20-Sep-10	CZN
300	Updated Technical Meeting Agenda Oct6-8, 2010	24-Sep-10	MVRB
301	IR Response from PC	24-Sep-10	PC
302	IR Response from AANDC	24-Sep-10	AANDC
303	IR Responses from GNWT	27-Sep-10	GNWT
304	IR Responses from DFO	28-Sep-10	DFO
305	Technical Meeting Logistic	1-Oct-10	MVRB
306	CZN's Preliminary Design Details of the Proposed Outfall for the Prairie Creek Mine	7-Oct-10	CZN
307	CZN's October 2010 Draft Analytical Results for Downstream Mixing of Proposed Outfall from the Prairie Creek Mine	7-Oct-10	CZN
308	Water and Effluent Quality Management Policy –Final Draft	8-Oct-10	CZN
309	Water and Effluent Quality Management Policy-Info Package	8-Oct-10	CZN
310	Table A9-1 Water Storage Pond Water Balance-corrected	8-Oct-10	CZN
311	EC-Request for Second Round of IRs	13-Oct-10	EC
312	PC-Request for Second Round of IRs	13-Oct-10	PC
313	AANDC-Request for Second Round of IRs	13-Oct-10	AANDC
314	CZN comments on 2nd round IRs	14-Oct-10	CZN
315	DFO Request for 2nd round	14-Oct-10	DFO
316	Transcripts: Technical Meeting Day 1-Oct 6, 2010	18-Oct-10	MVRB
317	Transcripts: Technical Meeting Day 2-Oct 7, 2010	18-Oct-10	MVRB
318	Transcripts: Technical Meeting Day 3-Oct 8, 2010	19-Oct-10	MVRB
319	Second round of information requests-instructions	20-Oct-10	MVRB
320	NBDB letter regarding meetings between parties	21-Oct-10	NBDB
321	Use of initial dilution zones-DFN letter	21-Oct-10	DFN
322	Surface Water Quality objectives 2006-Sask.Env.	21-Oct-10	NBDB
323	Toward the Development of Northern Water Standards	21-Oct-10	DFN
324	IR Response from NRCan	24-Oct-10	NRCan
325	IR from the MVRB to AANDC	29-Oct-10	MVRB

326	PC-2ND Round IRs	29-Oct-10	PC
327	EC-2nd Rounds IRs	29-Oct-10	EC
328	AANDC-2nd Rounds IRs	29-Oct-10	AANDC
329	Dehcho First nations 2nd Rounds IRs	29-Oct-10	DECHO FN
330	NRCan2nd Rounds IRs	29-Oct-10	NRCan
331	DFO 2nd Rounds IRs	29-Oct-10	DFO
332	TC 2nd Rounds IRs	3-Nov-10	TC
333	Request for party-status-Liidlii Kue First Nation	18-Nov-10	Liidlii Kue FN
334	Schedule for 2nd Round responses	23-Nov-10	CZN
335	Party status-updated list	25-Nov-10	MVRB
336	AANDC IR Response to MVRB	29-Nov-10	AANDC
337	Dehcho interim land withdrawal map	29-Nov-10	AANDC
338	MVLWB response to Dehcho FN second Round IR	29-Nov-10	MVLWB
339	EA Updates	31-Jan-11	MVRB
340	Second Round IR Response notification	4-Mar-11	MVRB staff
341	Request for Commitments Table	7-Mar-11	MVRB
342	Technical Reports due date	9-Mar-11	MVRB
343	IR2 responses-hard copy notification	10-Mar-11	MVRB
344	CZN letter regarding hearing schedule	10-Mar-11	CZN
345	Wildlife Survey December 2010	15-Mar-11	CZN
346	Wildlife Survey December 2010 figures	15-Mar-11	CZN
347	Wildlife Survey February 2011	15-Mar-11	CZN
348	Nahanni Butte Dene Band-hearings	16-Mar-11	NBDB
349	Nahanni Butte Dene Band Community Survey Jan 2011	17-Mar-11	NBDB
350	PC request for focused technical meeting	18-Mar-11	PC
351	AANDC request for focused technical session	18-Mar-11	AANDC
352	DFO request for focused technical session	21-Mar-11	DFO
353	Updated commitments Table	22-Mar-11	CZN
354	CZN letter regarding proposed Technical Meeting	26-Mar-11	CZN
355	Technical Meeting and revised hearing schedule	31-Mar-11	MVRB
356	Technical Meeting draft agenda April 12, 2011	4-Apr-11	MVRB
357	Technical Meeting Final Agenda	7-Apr-11	MVRB
358	Final Toxicity Test Report-Nautilus Environmental	9-Apr-11	CZN
359	Toxicity Identification Evaluation- Nautilus Environmental	9-Apr-11	CZN
360	Commitments from April 12, 2011 Technical meeting	13-Apr-11	MVRB
361	Timelines discussion with CZN and MVRB staff	13-Apr-11	MVRB Staff
362	Summary Report-April 12, 2011 Technical Meeting	15-Apr-11	MVRB
363	Request for modified Commitments Table	15-Apr-11	MVRB
364	Revised technical report due date and hearing schedule	19-Apr-11	MVRB
365	Technical Report Preparation	5-May-11	MVRB

366	Response to Commitments from April 12 Technical Meeting	6-May-11	CZN
367	Response to Commitments APPENDIX A	6-May-11	CZN
368	Response to Commitments APPENDIX B	6-May-11	CZN
369	Response to Commitments APPENDIX D	12-May-11	CZN
370	Response to Commitments APPENDIX E	12-May-11	CZN
371	Response to Commitments APPENDIX G	12-May-11	CZN
372	Response to Commitments APPENDIX H	12-May-11	CZN
373	Response to Commitments APPENDIX I	12-May-11	CZN
374	Response to Commitments APPENDIX C	12-May-11	CZN
375	Response to Commitments APPENDIX F	12-May-11	CZN
376	Response to Commitments APPENDIX B modified May 11	11-May-11	CZN
377	Response to Commitments APPENDIX C-updated	13-May-11	CZN
378	Invasive and Rare Plant Survey Report April 2011	13-May-11	CZN
379	Community hearings and formal public hearings	16-May-11	MVRB
380	Response to Commitments APPENDIX J	18-May-11	CZN
381	Additional Information to Commitments from Technical Meeting	24-May-11	CZN
382	Pre-hearing Conference Notification	30-May-11	MVRB
383	Pre-hearing Conference-start time clarification	31-May-11	MVRB
384	PC Preliminary Screening Notification	31-May-11	PC
385	Response to PC preliminary screening	3-Jun-11	MVRB
386	EC Technical Report	3-Jun-11	EC
387	EC Technical Report cover Letter	3-Jun-11	EC
388	Naha Dehe Dene Band Technical Report	3-Jun-11	NDDB
389	AANDC Technical Report	3-Jun-11	AANDC
390	PC Technical Report	3-Jun-11	PC
391	NRCan Technical Report	3-Jun-11	NRCan
392	DFO Technical Report	3-Jun-11	DFO
393	DFO Technical Report cover letter	3-Jun-11	DFO
394	GNWT Technical Report	6-Jun-11	GNWT
395	DFN Technical Report statement	6-Jun-11	DFN
396	Hearing procedures and presentation requests	7-Jun-11	MVRB
397	TC Technical Report	8-Jun-11	TC
398	Naha Dehe Dene Band Technical Report cover letter	8-Jun-11	NDDB
399	DFN Request for argument phase after hearings	8-Jun-11	DFN
400	DFN Request to MVLWB on winter road	8-Jun-11	DFN
401	Hearing Agenda for Prairie Creek Mine	9-Jun-11	MVRB
402	Naha Dehe Dene Band Technical Report follow-up letter	13-Jun-11	NDDB
403	Hearing Agenda Prairie Creek Mine-Final	13-Jun-11	MVRB
404	Letter from CZN on post-hearing information submission	15-Jun-11	CZN

405	Letter form Kirby Groat on Prairie Creek Mine	15-Jun-11	Kirby Groat
406	Village of Fort Simpson support for Prairie Creek Mine	16-Jun-11	Village of Fort Simpson
407	TC public hearing presentation	15-Jun-11	TC
408	AANDC community hearing presentation	15-Jun-11	AANDC
409	AANDC public hearing presentation	15-Jun-11	AANDC
410	Nahannie Butte Dene Band hearing presentation	15-Jun-11	NBDB
411	Dehcho First Nations public hearing presentation	15-Jun-11	DFN
412	PC community hearing presentation	16-Jun-11	PC
413	PC public hearing presentation	16-Jun-11	PC
414	DFO public hearing presentation	16-Jun-11	DFO
415	CZN Community hearing presentation part 1	16-Jun-11	CZN
416	CZN Community hearing presentation part 2	16-Jun-11	CZN
417	CZN Public hearing presentation part 1	16-Jun-11	CZN
418	CZN Public hearing presentation part 2	16-Jun-11	CZN
419	GNWT public hearing presentation	15-Jun-11	GNWT
420	GNWT public hearing presentation (air quality issues)	17-Jun-11	GNWT
421	EC Public hearing presentation	17-Jun-11	EC
422	NRCan public hearing presentation	20-Jun-11	NRCan
423	Letter from Dehcho Regional Helicopters	21-Jun-11	DECHO HELI
424	Undertaking-MOU between DFO and EC	27-Jun-11	EC
425	Undertaking-Guidance on derivation of SSWQO	27-Jun-11	EC
426	Protocol for the Derivation of Water Quality Guidelines	27-Jun-11	EC
427	NBDN community hearing presentation	27-Jun-11	NBDB
428	NBDB Public hearing presentation updated June 21	27-Jun-11	
429	Instructions on WQO committee and final submissions	27-Jun-11	MVRB
430	Liidlii Kue First Nation presentation	23-Jun-11	LKFN
431	Undertakings from June 23-24 public hearings	28-Jun-11	MVRB
432	Transcripts Nahanni Butte, Fort Simpson (June 22, 23, 24, 2011)	28-Jun-11	MVRB
433	EC letter on WQO committee	30 Jun-11	EC
434	NWT Chamber of Commerce letter of support	4-Jul-11	NWT C of C
435	NWT Chamber of Commerce presentation	4-Jul-11	NWT C of C
436	CZN on proposed water quality objectives committee	4-Jul-11	CZN
437	PC letter on post hearing process	4-Jul-11	PC
438	AANDC letter on water quality objectives committee	4-Jul-11	AANDC
439	Submission by Larry Swartz of Fort Simpson	8-Jul-11	PUBLIC
440	Undertaking-paste backfill documents from CZN	8-Jul-11	CZN
441	Undertaking-transportation needs response from CZN	8-Jul-11	CZN
442	Undertaking on mine waste management from NRCan	8-Jul-11	NRCan
443	WQO approach and final submissions	15-Jul-11	MVRB

444	MVRB response to PC	18-Jul-11	MVRB
445	Letter from MVRB to CZN on project modifications	19-Jul-11	MVRB
446	Meeting between CZN and AANDC on water quality objectives	2-Aug-11	CZN
447	Possible project modifications related to WQO	3-Aug-11	CZN
448	Request for Ruling -PC	16-Aug-11	PC
449	Letter from MVRB to parties- Request for Ruling	17-Aug-11	MVRB
450	Letter from CZN on the Request for Ruling	21-Aug-11	CZN
451	WQO Committee meeting-Aug 9, 2011	25-Aug-11	CZN
452	DFO comments on Request for Ruling	26-Aug-11	DFO
453	EC comments on Request for Ruling	26-Aug-11	EC
454	AANDC comments on Request for Ruling	26-Aug-11	AANDC
455	CZN letter re DFO Reply to Request for Ruling	29-Aug-11	CZN
456	MVRB ruling on PC request	1-Sept-11	MVRB
457	Letter form CZN re Paste Backfill and DMS	2-Sept-11	CZN
458	CZN_GNWT Socio-Economic Agreement	2-Sept-11	CZN
459	Desk Study of Process Water Treatment Options	2-Sept-11	CZN
460	GNWT Final Submissions	12-Sept-11	GNWT
461	NDDB Final Submissions	13-Sept-11	NDDB
462	EC Final Submissions	13-Sept-11	EC
463	DFN Final Submissions	13-Sept-11	DFN
464	PC Final Submissions	13-Sept-11	PC
465	DFO Final Submissions	13-Sept-11	DFO
466	AANDC Final Submissions	13-Sept-11	AANDC
467	NRCan Final Submissions	13-Sept-11	NRCan
468	Note to file-removal of CZN documents from registry	16-Sept-11	
469	CZN Final Submission on SSWQO	16-Sept-11	CZN
470	CZN comments on Final Arguments	16-Sept-11	CZN
471	CZN-DFO Meeting Report-Sept 1, 2011	16-Sept-11	
472	Note to file correction-removal of CZN documents from registry	19-Sept-11	MVRB
473	Closure of public record	22-Sept-11	MVRB